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ABSTRACT

Analyses completed prior to November 2001 provided a context for examining vocational education (VE) and a description of participation at secondary and postsecondary levels, a logical first step in evaluating VE's status and effectiveness. They were a small, but significant part of a comprehensive research agenda being conducted under the National Assessment of Vocational Education (NAVE). Four key themes emerged. First, current education, labor market, and policy trends were likely to broaden the debate on the reauthorization of the Carl D. Perkins Vocational and Technical Education Act of 1998. Among the trends are the following: high schools increasingly emphasize academic reform and college preparation; good jobs require at least some postsecondary education; and Perkins is still the largest single source of Department of Education funds spent on high schools. Second, federal vocational policy attempted to achieve multiple goals and objectives. Third, secondary VE remained a large component of the high school curriculum, but the full effects of academic reform were not yet evident. For instance, vocational participation rates have been relatively stable; many types of students are involved in VE, including special populations; participants in VE have increased their academic course taking, but important gaps remain between them and other students; and students take more vocational than math or science courses. Fourth, postsecondary VE served a diverse set of students, many of whom would not complete the course work needed to fulfill their objectives. (Contains 56 references.) (YLB)

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NAVE NATIONAL ASSESSMENT OF VOCATIONAL EDUCATION

INTERIM REPORT TO CONGRESS

U.S. Department of Education
Office of the Under Secretary

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NATIONAL ASSESSMENT OF VOCATIONAL EDUCATION

INTERIM REPORT TO CONGRESS

2002

Marsha Silverberg
Elizabeth Warner
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U.S. Department of Education
Office of the Under Secretary

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September 2002

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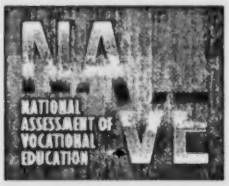

Accompanying Statement from Independent Advisory Panel

Chairman John A. Boehner
Committee on Education and Workforce
U.S. House of Representatives
Washington, DC 20515

Chairman Edward M. Kennedy
Committee on Health, Education, Labor, and Pensions
U.S. Senate
Washington, DC 20510

Dear Chairman Boehner and Chairman Kennedy:

In the amendments to the 1998 *Carl D. Perkins Vocational and Technical Education Act*, the Congress called upon the Secretary of Education to appoint an independent panel of vocational and technical education administrators, educators, and researchers, as well as parents and representatives of business, labor, and other interested parties to advise the U.S. Department of Education on the evaluation and assessment of programs authorized under this statute.

This Independent Advisory Panel—which has met a number of times to advise the Department on research issues and priorities—wanted to use the occasion of this first, interim report of the National Assessment of Vocational Education (NAVE) to express its views on several issues related to the forthcoming reauthorization of the Perkins Act. This panel will have more extensive comments and recommendations when the final NAVE report is completed. However, this interim report is rich in findings that should play an important role in shaping congressional and public discussion of the future of career and technical education in the United States.

Vocational education has occupied a significant place in American education since the first federal legislation was enacted in 1917 to help ensure that our nation's young people had the skills necessary to succeed in a changing world of work. Eighty-five years later, after 13 legislative reviews and revisions and far-reaching economic, social and technological changes, one thing remains constant: America's young people still need the skills to succeed in a changing world of work, although the mix of skills is constantly evolving.

Three points are especially worth bearing in mind:

1. At the beginning of the 21st century, vocational education remains an important part of the high school curriculum, although its function may be changing. Many students take vocational courses to prepare themselves both for the world of work and further educational programs. Moreover, while high school students are taking increasing numbers of academic courses, the decline in vocational course taking prior to the 1990s leveled off during the last decade. In short, these are courses that millions of students find valuable.

2. Whereas all students should be well-prepared academically and have the opportunity to pursue a bachelor's degree or other postsecondary training, it is important to recognize that two-thirds of America's young people do not obtain a four-year college degree and at least 25 percent go to work directly after high school. The reality is that most young people must draw on skills learned outside of four-year colleges to succeed in the workforce. That's where good career and technical education at secondary schools and community and technical colleges comes in. Moreover, these vocational students can be held to high standards. States such as New York are working to provide rigorous career and technical courses, and the standards embedded in them are reflected in state assessments.

3. Against a backdrop of frequent business complaints that young workers lack both general (literacy, numeracy, etc.) and specific technical skills, it is essential that our education system produce young people whose skills are a match for the jobs in our nation's workforce. Many jobs require technical skills, as well as strong academic skills, that can be learned in secondary and postsecondary vocational courses but do not require a bachelor's degree. That is one reason many Americans with bachelors' degrees are also turning to career and technical courses in community colleges. In the Los Angeles transportation industry, for example, three-fourths of all transit jobs do not require a degree yet demand high-level skills. These are well-paying jobs, because these skills translate into the high productivity that has brought the United States the world's highest standard of living. For many young Americans, career and technical courses can make the difference between living in poverty or entering the middle class.

This interim report provides ample material to begin the debate on how best to support quality career and technical education. On behalf of the entire panel (see list on next page), we urge the reader to carefully examine the data and analysis in this report.

Sincerely,

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First, the work of the NAVE is conducted with the support of the Independent Advisory Panel, whose names and affiliations appear at the front of this report. Their guidance has been invaluable.

Several colleagues at the Department played important roles. At the Office of Vocational and Adult Education (OVAE), we are especially grateful for the input and cooperation provided by Assistant Secretary Carol D'Amico, Deputy Assistant Secretary Hans Meeder, Dennis Berry, special assistant for research, and Sharon Belli, OVAE's liaison to NAVE. We would also like to thank former Assistant Secretary Patricia McNeil for providing the initial support for this assessment. Our partnership with Lisa Hudson, at the National Center for Education Statistics (NCES), was extremely productive. We also received useful advice from Alan Ginsburg, director of the Planning and Evaluation Service (PES).

The foundation of this report is the analysis undertaken by several contractors with whom we collaborated closely. In particular, we would like to thank Karen Levesque and Gary Hoachlander at MPR Associates, and Tom Bailey of Teachers College, Columbia University, for their careful work with the data and their help in interpreting results.

Finally, we appreciate the efforts of all those who helped with the production of the report. Andrew Yarrow of PES provided editorial support. Angela Clarke and Ann Nawaz from PES assisted with early document preparation and report dissemination. Barbara Kridl and Leslie Retallick of MPR Associates are responsible for the cover and layout design.

In the end, however, the judgments expressed in this report are those of the authors. While conducted by PES in the Office of the Under Secretary, this assessment is an independent study and does not necessarily reflect the views of the U.S. Department of Education.

Marsha Silverberg
Elizabeth Warner
David Goodwin
Michael Fong

► Executive Summary

Nearly half of all high school students and about one-third of college students are involved in vocational programs as a major part of their studies. Perhaps as many as 40 million adults—one in four—engage in short-term, postsecondary occupational training. Given the magnitude of the vocational education enterprise, the ways in which students participate and the benefits they may receive can have significant consequences for the nation's workforce.

1998 Perkins Vocational and Technical Education Act

Federal support for vocational education, and for understanding its outcomes, has a long history. Most federal objectives for improving the quality and availability of vocational programs are articulated through the Carl D. Perkins Vocational and Technical Education Act and its predecessors since the Smith-Hughes Act of 1917. The most recent act (known as Perkins III) was passed in October 1998, and reflects both continuity with previous vocational legislation and some substantive departures. As policymakers begin to consider further changes in law—in anticipation of the reauthorization scheduled for 2003—they will be examining vocational education as a field in transition, prompted by sweeping changes in federal, state, and local education and training priorities.

As was true with previous vocational legislation, Perkins III directs the secretary of education to complete an "independent assessment of vocational and technical education programs." This report, the first in a series by the new National Assessment of Vocational Education (NAVE), provides information to help policymakers shape future improvements in this particular component of American education.

Interim Report Highlights

This interim report presents a small, but significant part of a comprehensive research agenda being conducted under NAVE. Studies still underway will examine the effect of vocational education on student outcomes, the quality of implementation, and the role of accountability provisions and other aspects of federal policy; these results will be presented in a final report. The interim report provides both a context for examining vocational education and a description of participation at the secondary and postsecondary levels, a logical first step in evaluating the status and effectiveness of vocational education. Four key themes emerged.

1. *Current education, labor market, and policy trends are likely to broaden Perkins reauthorization debates.*

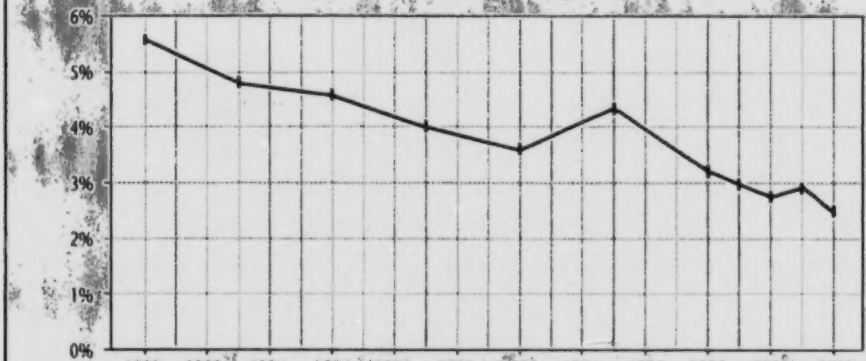
Each time Congress considers federal aid for vocational education, the outcome reflects an understanding of the economic and educational priorities of the time and the nature of the federal role in education. The upcoming reexamination of the Perkins Act is likely to be shaped by several factors:

- ***High schools increasingly emphasize academic reform and college preparation.*** The poor performance of seniors on national and international tests, declining graduation rates, and high rates of college remediation have raised concerns about academic achievement at the high school level. Partly in response, nearly every state has set higher academic standards for high school graduation, and many have begun to include exit exams. The challenge many students, including those in vocational programs, face in meeting the new standards has raised questions about the role of high school courses lacking clear academic focus.

- ***Good jobs require at least some postsecondary education.*** Both high- and low-paying employment are available in the labor market, but a college credential of some kind is needed for the better-paying jobs. Employment growth in occupations requiring a vocational associate's degree is projected to be higher (30 percent) than overall employment growth (14 percent) through 2008 (Erard forthcoming). Thus, demand for postsecondary vocational education is likely to remain strong.

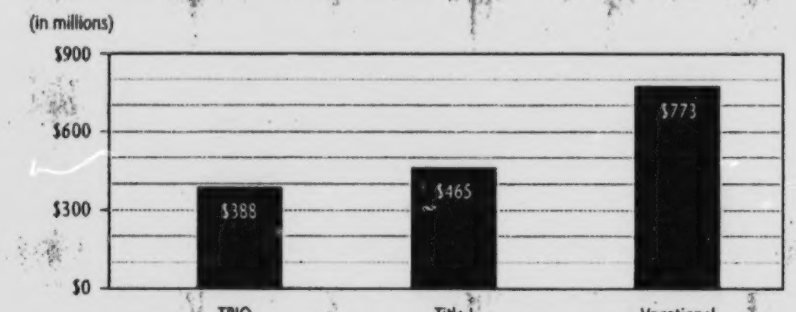
- ***For the past 20 years Perkins has represented a declining share of federal education budgets, but it is still the largest single source of Department funds spent on high schools.*** Perhaps because the primary objective of vocational education has not appeared well aligned with other priorities, appropriations for the Perkins Act and its predecessors have not kept pace with either inflation or the expansion of other Department of Education (ED) programs and ED's overall budget. In fiscal year 1980, funding for vocational education represented about 6 percent of total ED appropriations; it is now less than 3 percent (Figure 1). Despite the relative declining share, Perkins III remains the largest single source of federal education funds used to support high schools. Comparing dollars spent at the high school level, vocational education appears to be of equal federal priority as other programs focused on raising academic achievement (Title I) and preparing students for college (TRIO) (Figure 2).

Figure 1
Perkins Vocational Education Funding (Appropriations) as a Percentage of Total U. S. Department of Education Budgets: 1980–2002



SOURCE: Internal NAVE Analysis.

Figure 2
Selected U.S. Department of Education Spending on High Schools: FY 2001



SOURCE: Internal NAVE Analysis.
NOTE: Figure reflects estimated portion of total appropriation spent on high schools.

2. *Federal vocational policy attempts to achieve multiple goals and objectives.*

Evolving priorities clearly have moved federal support for vocational education toward fulfilling a broader set of objectives than training students for work in factories and on farms after high school, the original aim of federal vocational legislation

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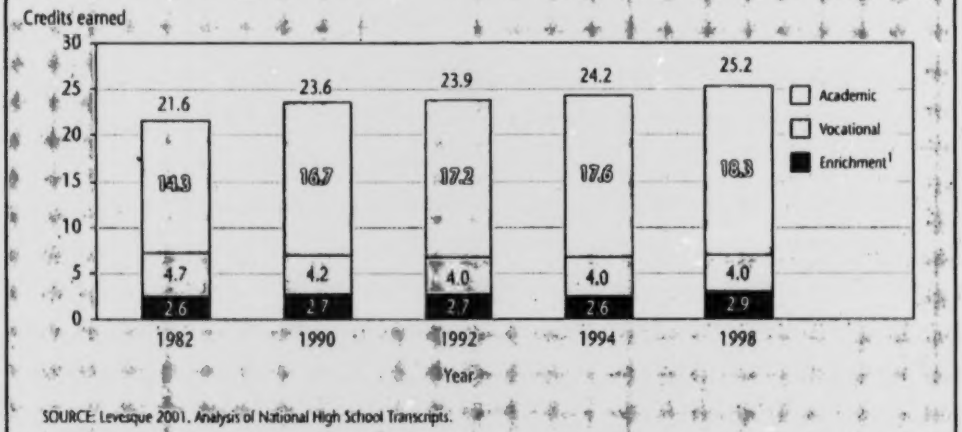
at the turn of the 20th century. For example, the stated purpose of the 1998 Perkins III is to enhance not only the vocational and technical skills of students who choose to participate in vocational education but also their academic skills. In addition, other sections of the legislation suggest that vocational education is expected to contribute to high school completion, entry into postsecondary education and training, postsecondary degree completion, and employment.

Currently, federal policy allows states, school districts, and postsecondary institutions to decide which objectives are the highest priority for Perkins spending. In contrast, Title I of the recently enacted No Child Left Behind Act, with funding now 10 times greater than Perkins, is unambiguously focused on one core mission: raising the academic achievement of disadvantaged students.

3. *Secondary vocational education remains a large component of the high school curriculum, but the full effects of academic reform are not yet evident.*

Although there has been little change in the amount of vocational course work taken by high school students over the past decade, vocational education's share of the overall high school curriculum has declined as students earned more academic credits (Figure 3).

Figure 3
Average Credits Earned by High Schools Students, by Type of Course Work: 1982–1998



SOURCE: Levesque 2001. Analysis of National High School Transcripts.
[1]Includes courses such as art, music, and driver's education.

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- ***Vocational participation rates have been relatively stable during the last decade.*** Across most of the 1990s, almost 45 percent of all high school graduates earned three or more occupational credits, the equivalent of three, year-long courses. Most of these students (25 percent of all graduates) "concentrated" their courses in a single program area (e.g., health or business). Occupational "concentrators" are the closest proxy for vocational program completers.

- ***Many types of students continue to be involved in vocational education, including those in "special population" groups.*** For the most part, there has been little change in who participates in vocational education over the last decade. Vocational education serves a diverse set of students, with most coming from the middle range of academic and income advantage. Still, some groups continue to participate more substantially than others: students who enter high school with low academic achievement, have disabilities, are male, English-language proficient, or from lower-income or rural schools. Gender differences remain. Girls' vocational course taking has been declining while that of boys has remained consistent. Despite these trends, differences in the rates of participation in computer technology courses, geared to a potentially high-paying field, virtually disappeared by 1998.

- ***Students who participate most in vocational education have increased their academic course taking, but important gaps remain between them and other students.*** By 1998 the gap in academic credits earned between occupational concentrators and other students had grown smaller (from 1.6 in 1982 to 1.1 credits in 1998). However, vocational students still take less rigorous academic courses than do other students: for example, substantially fewer concentrators (26 percent) than non-concentrators (42 percent) completed a college preparatory curriculum (Table 1).

Table 1

Academic Credits and Course Taking for Occupational Concentrators[1] and Non-concentrators: 1998

	Concentrators	Non-concentrators
Core Academic Credits Earned	13.7	14.8
"New Basics" Curriculum[2]	45.7%	59.4%
College-Prep Curriculum[3]	25.9%	43.2%
Algebra 1	87.1%	93.2%
Advanced Math[4]	26.0%	42.4%

SOURCE: Levesque 2001. Analysis of National High School Transcripts.

[1]Concentrator = A graduate earning three or more credits (years) of occupational vocational education in a single program area (e.g., business services or health care).

[2]New Basics = Four credits of English, three credits each of math, science, and social studies.

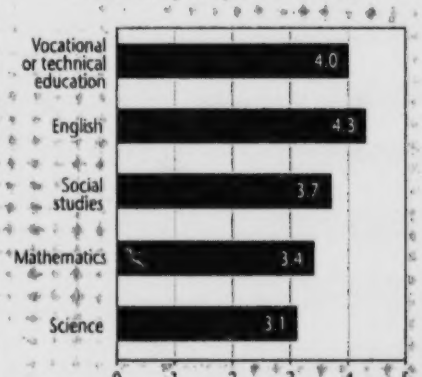
[3]College-Prep Curriculum = Four credits of English; three or more credits in math at the algebra 1 or higher level; two or more credits in biology, chemistry, and physics; two or more credits in social studies with at least one credit in U.S. or world history; and two or more credits in a foreign language.

[4]Advanced Math = Mathematics instruction including algebra 3, trigonometry, and above.

- ***Students take more vocational than math or science courses*** (Figure 4). Despite the emphasis placed on academic reforms over the last decade, high school students earn more credits in vocational education (4.0) than they do in math (3.4) or science (3.1).

Figure 4

Average Credits Earned by High School Students, by Subject Area: 1998



SOURCE: Levesque 2001. Analysis of National High School Transcripts.

These course-taking patterns may well change, as school reform continues and as rigorous state exit exams become more common. By 1998–1999, nearly 20 states were already phasing in these assessments, and 6 more were in the process. Many students who pursue a vocational program of study come to

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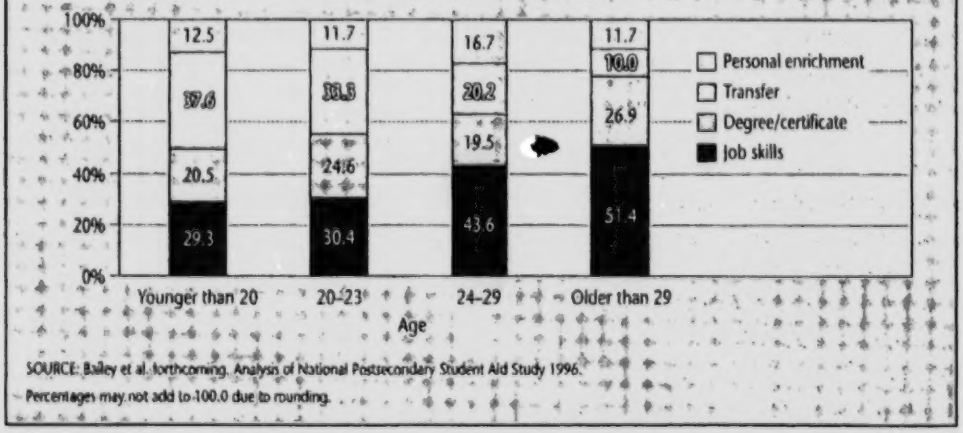
high school with lower levels of academic achievement and are therefore likely to face the stiffest challenges in passing the new assessments. Participation in secondary vocational education and other electives may decline as students focus their efforts on passing these exams. Some evidence suggests that even the minimum competency exams required for graduation in some states or districts in the early 1990s may have reduced vocational course taking (Bishop and Mane forthcoming).

4. *Postsecondary vocational education serves a diverse set of students, many of whom will not complete the course work needed to fulfill their objectives.*

About one-third of all students in undergraduate postsecondary education are considered to be in vocational programs. The Perkins Act defines vocational education as occupational programs requiring less than a baccalaureate degree (P.L. 105-332, Section 3(29)), some of which are offered at four-year postsecondary institutions. Not only do sub-baccalaureate students outnumber those in baccalaureate programs, but twice as many sub-baccalaureate students choose a vocational over an academic major.

These sub-baccalaureate vocational students vary in age and work experience, and they report enrolling for different reasons—to get an associate's degree or institutional certificate, to transfer and pursue a bachelor's degree, to enhance their job skills, or to engage in personal enrichment activities (Figure 5). The students also differ in their personal resources, with students enrolled in for-credit, degree-oriented course work more economically disadvantaged than those who enroll in noncredit courses.

Figure 5
Percentage Distribution of Postsecondary Vocational Students, by Age and Reported Primary Goal



SOURCE: Bailey et al. forthcoming. Analysis of National Postsecondary Student Aid Study 1996.
Percentages may not add to 100.0 due to rounding.

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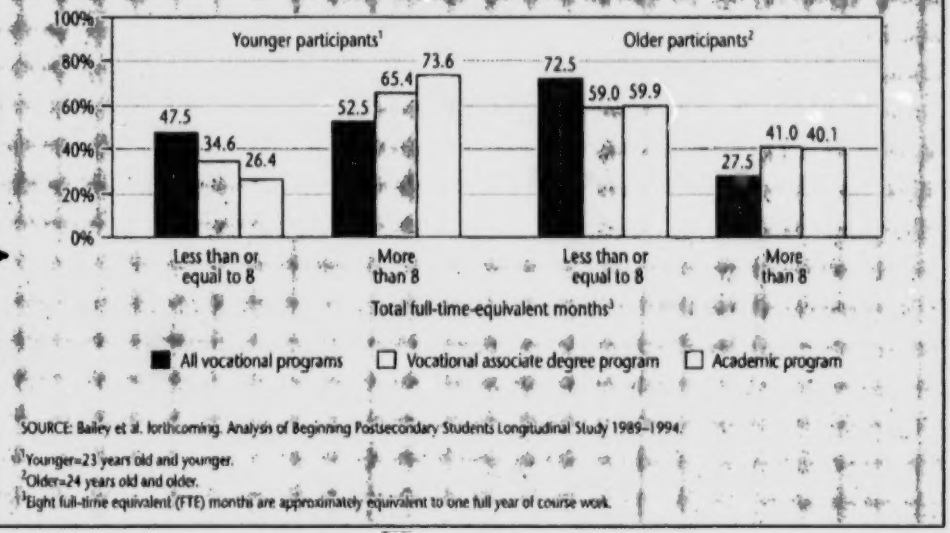
However, like their academic counterparts, many vocational participants leave sub-baccalaureate institutions and programs having completed few courses (Figure 6). Just under half (47.5 percent) of the younger students—those less than 24 years old—in vocational programs complete eight or fewer months of postsecondary course work over a five-year time period. Nearly three-quarters (72.5 percent) of older vocational participants complete no more than eight months of course work. Eight months of full-time equivalent course work corresponds to what might be considered a year of postsecondary education and training.

Figure 6
Percentage of Sub-baccalaureate Students, by Major and Age and Number of Months of Course Work Completed within a Five-Year Period



SOURCE: Bailey et al. forthcoming. Analysis of Beginning Postsecondary Students Longitudinal Study 1989–1994.

[1]Younger=23 years old and younger.
[2]Older=24 years old and older.
[3]Eight full-time equivalent (FTE) months are approximately equivalent to one full year of course work.

For older students with substantial work experience who enroll primarily to improve their job skills, a course or two may be exactly what is needed or desired. Some may participate to help them obtain one of the newly emerging industry- or employer-developed certifications (e.g., Microsoft, Cisco, Automotive Service Excellence), which may be an important way to realize labor market gains without actually earning a degree or institution-based certificate.

Those same one or two courses, though, fall well short of expectations for those working toward a postsecondary education credential. About half of all postsecondary vocational students indicate wanting to earn a degree or certificate, includ-

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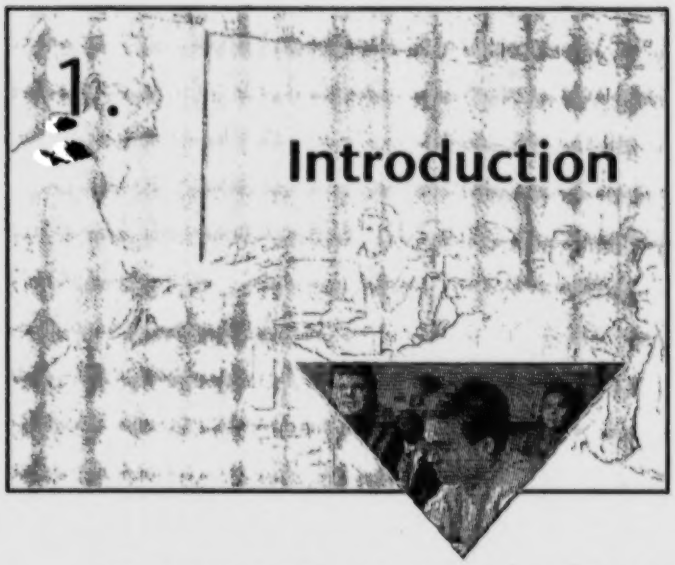
ing those who intend to transfer to obtain a bachelor's degree (Figure 5). Many of these students are younger, recent high school graduates with limited job history. For these students, in particular, a college degree can lead toward labor market success as well as the fulfillment of a personal goal. But it is likely that the half of younger vocational students who leave postsecondary education with fewer than eight months of course work (Figure 6) do so without having achieved their objectives and without a concrete signal of their skills.

Conclusions and Next Steps

Vocational education and its place in American education continue to evolve. The broadening of its goals, the increasing diversity of participants, and the changing education and labor market climate in which it operates, suggests vocational education is a flexible option for schools and students.

With this flexibility comes some challenges, however. At the high school level, participation in vocational education is an elective choice that faces increasing pressure from emphasis on academic improvement and testing. For both secondary and postsecondary vocational education, the wide range of participants and objectives raises a question about how effective a role federal policy plays and whether that policy can or should promote a clearer set of priorities.

The data in this initial report addressed one of several important questions for policy: Who enrolls in vocational education and for what purpose? That analysis raises additional questions about the effectiveness of vocational education in improving student outcomes, the consequences of new funding and accountability provisions for programs and participants, the implementation and quality of vocational education, and its alignment with other major reform efforts. The final NAVE report, scheduled for submission later this year, will provide more rigorous evidence to help policymakers and practitioners respond to these issues.



1. Introduction

Nearly half of all high school students and about one third of college students are involved in vocational programs as a major part of their studies. Perhaps as many as 40 million adults—one in four—engage in short-term, postsecondary occupational training (Darkenwald and Kim 1998). Given the magnitude of the vocational education enterprise, the ways in which students participate and the benefits they may receive can have significant consequences for the nation's workforce. This report, the first in a series by the new National Assessment of Vocational Education (NAVE), provides information to help policymakers shape future improvements in this particular component of American education.

Federal support for vocational education, and for understanding its outcomes, has a long history. Most federal objectives for improving the quality and availability of vocational programs are articulated through the Carl D. Perkins Vocational and Technical Education Act and its predecessors since the Smith-Hughes Act of 1917.[1] The most recent act, passed in October 1998, reflects both continuity with previous vocational legislation and some substantive departures. As policymakers begin to consider further changes in law—in anticipation of reauthorization scheduled for 2003—they will be examining vocational education as a field in transition, prompted by sweeping changes in federal, state, and local education and training priorities. Solid evidence will be needed to enable new policy to be responsive to these shifts.

[1]Other federal programs, such as student financial aid and tax credits, help provide access to occupational training at the postsecondary level; these programs are an important source of federal *financial* support for vocational education.

1998 Perkins Act

Signed into law on October 31, 1998, the Carl D. Perkins Vocational and Technical Education Act (referred to as "Perkins III") represented almost four years of deliberations over how to modify federal vocational legislation. Previous periods of legislative change had focused on particular policy concerns (Table 1.1). Over time, these changes increasingly promoted educational equity, improvement in program quality, and movement away from vocational education's origins as a separate program or "track." These objectives were also evident in the Perkins III debates, but the Congress that passed the 1998 law sought to address additional concerns and to do so in different ways.

Key Changes

Congress made several important substantive changes to the Perkins Act in 1998. These changes reflected certain themes, or priorities for education and the role of the federal government in education policy:

- ***Increased emphasis on academics:*** Continuing the trend begun in earlier legislation, Perkins III further focused attention on improving the academic performance of vocational students; the stated purpose of the 1998 law suggests that federal vocational education funds be directed toward improving both academic and vocational-technical skills, and new accountability provisions require state and local grantees to ensure that vocational students be held to the same academic standards as other students.

- ***Greater flexibility in the use of funds:*** Congress released state and local agencies from certain federal rules governing how Perkins grants were allocated and used for program improvement; set-aside funding streams for gender equity were eliminated, as were most other funding distribution requirements weighted toward special population groups (e.g., students with disabilities).

- ***More funds directed to the local level:*** Congress wanted a larger share of funding allocated to local programs, expecting that additional resources would reach the classroom and have the potential to affect student outcomes more directly; elimination of the set-asides allowed a higher proportion of Perkins funds to pass to local districts, schools, and postsecondary institutions.

- ***Creation of a "higher stakes" accountability system:*** Although states had been expected to gather information on vocational students' outcomes since 1990, Perkins III imposed requirements for state reporting to the U.S. Department of

Table 1.1
Overview of Previous Federal Vocational Legislation

Periods of Vocational Legislation	Policy Objectives and Tools
1917–1963	Provide trained workers for growing semi-skilled occupations and retain more students in secondary education through: ■ Expansion of separate vocational schools and programs. ■ Funds for basic maintenance of programs. ■ Focusing on agriculture, industry, and home economics for high school students.
1963–1968	Improve and expand vocational education through: ■ Separate funds for innovative programs, research, and curriculum development. ■ Support for construction of regional or area vocational schools. ■ Support for adult training and retraining (postsecondary vocational education). ■ Encouragement to states to promote vocational education equity, better service to "special populations."
1968–1990	Improve vocational education and facilitate access through: ■ Periodic encouragement to states to distribute some funds by community's economic need and levels of student disadvantage. ■ Establishment and expansion of set-aside funds to serve special population groups.[2] ■ Prohibiting the use of most federal funds for maintenance of programs. ■ Continuation of set-aside funds for program improvement.
1990–1998	Expansion of equal access and emphasis on academic quality through: ■ Introducing intrastate and intra-district funding formulas: distribution to agencies and schools weighted by special populations. ■ Promoting "integration" of academic and vocational education and "all aspects of the industry." ■ Set-aside funds for new program linking secondary and postsecondary vocational education: Tech-Prep. ■ Requirement that states develop performance standards.

SOURCE: Millsap and Muraskin 1992; Boesel et al. 1994a.

[2]The precise number of groups regarded as "special populations" expanded over two decades.

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Education and potential rewards and consequences for states that can and cannot improve student performance, including the performance of special populations.

- ***Improved coordination with related initiatives:*** After debating but discarding the option of combining the two laws, Congress enacted Perkins III right after passage of the Workforce Investment Act (WIA); language in both laws were intended to provide opportunities to integrate vocational education institutions into state and local workforce development and job training systems.

Continuity with the 1990 Perkins Act Amendments

Congress did not alter the basic structure of the Perkins Act in the 1998 reauthorization, however. Perkins remains primarily a formula grant program.[3] Funds are still distributed to states based on population counts, while states allocate grants to local secondary and postsecondary institutions based largely on the numbers of low-income students the institutions serve. States continue to have discretion to determine the proportion of their state grant that will be allocated to secondary versus postsecondary vocational education.

Moreover, Perkins III continues to emphasize the major programmatic strategies reflected in the 1990 Perkins amendments (Perkins II). Specifically, it promotes:

- Integration of academic and vocational education, by implementing coherent sequences of academic and vocational and technical instruction.
- Broadening the focus of vocational education content to emphasize industries and careers in place of entry-level, job-specific training.
- Strengthening the links between secondary and postsecondary education through Tech-Prep and other strategies.

Unresolved Policy Debates

While the strategies outlined in the 1998 Perkins Act can be interpreted as reflecting policymakers' current priorities and guidance for vocational education, the legislation in no way puts to rest fundamental questions that have been raised about its future role. Both in congressional deliberations prior to passage of Perkins III and in continuing discussions in the vocational education community, several issues remain unresolved that could have implications for reauthorization:

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[3]The Perkins Act contains some set-asides (e.g., 1.25 percent of appropriations for grants to Native American tribes and tribal organizations) which are awarded by the U.S. Department of Education through a competitive grant program. In addition, funds allocated to states by formula under Title II of Perkins III, the Tech-Prep Education Act, can be awarded to local grantees using either a formula or a competitive grant process.

- ***How essential is vocational education at the secondary level?*** High schools' and policymakers' priorities increasingly seem to be on academic improvement and college entry. Perhaps as a result, vocational programs have become a less substantial part of the high school curriculum (see Chapter 3), and postsecondary institutions, particularly community colleges, have come to play a much larger role in career and job preparation. Given this trend, the limited federal resources available for high schools, and the costs of keeping both secondary and postsecondary vocational programs up-to-date, some question whether vocational education as a program of study belongs in high school or whether this type of specialization should occur at the college level.

- ***Who is secondary vocational education for and what is its purpose?*** Vocational education has long been supported, in part, as an important strategy—a "second-chance" opportunity—for high school students with weaker academic skills or little interest in pursuing college credentials. Over the last decade, however, federal legislation and most state agencies have promoted the notion of vocational education as preparation for high-tech, high-skill careers—where the academic skills required may be substantial. In fact, over the last decade, states and local programs have sought to attract more academically talented students into vocational education programs (see Chapters 2 and 3).

- ***What is the federal role in postsecondary vocational education?*** To many, the Perkins Act reads as a set of strategies designed to improve secondary vocational education. In fact, policymakers' concerns mostly have been with secondary vocational education, leaving little imprint of the specific goals or problems federal Perkins funds are expected to address at the postsecondary level. Currently, Perkins grants can be used for any of the wide array of offerings eligible institutions provide and to support any of the varied objectives pursued by those who participate in postsecondary vocational education. One issue policymakers may consider is whether Perkins can or should address all of these populations and purposes or whether a targeted approach for federal resources might have benefits.

- ***Should vocational education be "education" or "training"?*** For the past decade, the Perkins Act has emphasized teaching about "all aspects of the industry"—not just an entry-level job. But much of vocational education remains organized around traditional occupational categories (Hoachlander 1998). In recent years, many schools have been attracted to—and policymakers have touted—vocational programs offered by high-tech firms such as Microsoft and Cisco; to some, this emphasis on firm-specific skill training seems inconsistent with the broader approaches promoted in federal policy. At the postsecondary level, Perkins pro-

vides some legislative signals of preference for for-credit occupational programs culminating in an associate's degree (education), as compared to noncredit, short-term training courses. But some groups reporting growth in noncredit enrollments have wondered whether this federal emphasis is appropriate.

- ***What is the best way to help special populations?*** Deep concerns that different groups have uneven access to high-quality education, including vocational education, initially led policymakers to set aside funds for underserved groups. In 1998, that approach was replaced by one focused on holding grantees accountable for improving the education outcomes of all vocational education participants, including targeted special populations. It may be many years before the full effects of performance reporting will be known.

These debates are as much philosophical as practical, reflecting some divergence of opinion about the role of federal vocational education policy and the specific objectives it addresses. Research and data can contribute to and inform these discussions but are not likely to settle them. Federal policymakers may choose to take up these issues directly or leave them to be determined by state and local agencies, as is currently the case.

National Assessment of Vocational Education

As was true with previous vocational legislation, Perkins III directs the secretary of education to complete an "independent evaluation and assessment of vocational and technical education programs under this Act" (Section 114 (c)(3)). This National Assessment of Vocational Education (NAVE) is intended to support the broad goals of improving vocational education and to provide Congress with information to guide reauthorization of the Perkins Act, scheduled for 2003. Based on this schedule, the law called for the NAVE to deliver an interim report in early 2002 and a final report later in the year.

Independent Advisory Panel

Following earlier legislative tradition, Perkins III also directs the secretary to appoint an Independent Advisory Panel to provide advice on conducting NAVE. Such a panel was selected in mid-1999, and includes employers, secondary school and district administrators, representatives of postsecondary institutions, state directors of vocational education at both the secondary and postsecondary levels, union representatives, education and workforce development policy experts, and researchers with experience in relevant fields.

This panel has met on a number of occasions to: (1) identify the key policy and research questions NAVE will address, (2) review the analytic framework and study designs, and (3) receive and help interpret results from NAVE analyses, including those described in this interim report. Perkins III requires the panel to submit to Congress and the secretary its own independent analysis of NAVE findings and recommendations. The letter to Congress found at the front of this report represents the panel's first official communication.

Research Objectives and Questions

As a key source of policy information, NAVE will examine the status of vocational education across the country and, to the extent possible, evaluate the early impacts of the new law on vocational education practice. The research agenda must also take into account the wide range of topics Congress mandated in Perkins III (Section 114), including: (1) implementation of state and local programs; (2) the impact of changes in federal funding formulas; (3) teacher quality and teacher supply and demand; (4) student participation in vocational education; (5) academic and employment outcomes; (6) employer involvement and satisfaction with vocational education programs; (7) education technology and distance learning; and (8) the effect of accountability requirements on program performance.

At a broader level, however, NAVE is guided by three key policy issues (Table 1.2):

Table 1.2

Key Policy and Research Issues for NAVE

How does, or can, vocational education improve the outcomes of secondary students who choose to enroll in vocational and technical programs?

Perhaps the most important issue for vocational education is who participates at the secondary level and how well they fare in school and beyond. In an era of accountability for results, policymakers are interested in both changes in vocational course-taking patterns and how the varied ways of participating contribute to key student outcomes, such as academic skills, success in college, and earnings. NAVE will explore these important trends, as well as the role of federal policy in efforts to improve vocational education. The evaluation will examine the extent to which federal strategies for improving program quality are reflected in school and classroom practice and the relationship between vocational education and school reforms under way in many states and communities.

What is the nature and impact of vocational education at the sub-baccalaureate level, and what is its relationship to current workforce development efforts?

Given the labor market value of college credentials, "life long learning," and flexibility in skills, the role of sub-baccalaureate vocational education may be of increasing policy interest. NAVE will assess patterns of enrollment and participation in postsecondary vocational education, and their relationship to outcomes and impacts. In examining the current and potential influence of federal vocational policy, studies will also evaluate: (1) the role that postsecondary vocational education is playing in state and local workforce development strategies and (2) the extent to which the 1998 federal Workforce Investment Act is having an effect on the delivery of postsecondary vocational education.

Is the policy shift from set-asides and legislative prescription to flexibility and accountability likely to improve program quality and student outcomes? How do special populations fare?

For the past two decades, federal policy has focused on serving those most at-risk, commonly termed the "special populations." Perkins III represents a major shift in direction, eliminating both set-aside funds for certain special population groups and requirements that local funds be prioritized to serve the highest concentrations of special populations. In their place is an increased emphasis on accountability, including the requirement that states track the progress of special population groups. NAVE will assess whether: (1) increased flexibility seems to be changing educational priorities or practices, (2) special populations are being helped or hurt as a result, and (3) accountability requirements appear to be improving the quality of vocational education for all students.

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Evaluation Strategies

Addressing the primary vocational policy questions requires a set of interrelated but distinct studies. NAVE commissioned an extensive set of independent assessments (see Upcoming NAVE Study Reports at the end of this report). The overall research agenda calls for diverse data collection and analysis methods: qualitative case studies, national surveys, use of state administrative databases, and both descriptive statistics and sophisticated econometric estimation of program effects. NAVE will also draw on relevant, high-quality studies sponsored by other organizations and federal agencies. NAVE reports, including this one, seek to integrate information from a variety of data sources to address the key research and policy questions.

NAVE's short time line ultimately affects the particular studies undertaken and the ways in which the information can be used. First, NAVE often had to rely on existing data for national estimates. Available national data, mostly from the Department's National Center for Education Statistics (NCES), are often not as current as policymakers would like.

Second, Congress mandated both an interim and a final NAVE report in 2002. As with other studies of federal legislation, NAVE is operating in a period when many of the important changes in Perkins III will have barely begun. Most states opted for "transitional plans" which, in effect, deferred implementation of Perkins III provisions until fall 2000. Thus, new data collected to meet NAVE reporting dates will reflect very early efforts made in response to new legislative provisions. Conclusions regarding the longer-term prospects for Perkins III will require further evaluation.

Interim Report

This Interim Report presents a small, but significant part of the comprehensive NAVE research agenda. The report is based on findings from analyses completed prior to November 2001, with most of the NAVE studies still under way. As a result, any conclusions or policy recommendations will be included in the final report. Nonetheless, important implications can be, and have been, drawn from the results described here.

The report focuses on describing patterns of participation at the secondary and postsecondary levels. Analysis of participation is a logical first step in examining the status and effectiveness of vocational education. The extent and nature of involvement, how students combine vocational and academic course taking, and the characteristics and goals of those who participate—are all important factors in determining the importance of

vocational education to current and prospective students and to society as a whole. An evaluation of the contribution of vocational education to student outcomes will be a central component of the NAVE final report.

Organization of the Report

Specifically, the interim report is divided into five chapters (Table 1.3):

Table 1.3
Outline of Interim Report

Chapter	Title	Description
1	Introduction	Overview of the 1998 Perkins Act, the National Assessment of Vocational Education (NAVE), and this interim report.
2	Context for Assessing Federal Support for Vocational Education	The education, labor market, and policy factors that are likely to shape vocational education and Perkins reauthorization; the defining of vocational education and its objectives.
3	Participation in Secondary Vocational Education	Trends in the nature of high school-level vocational course taking and the academic courses vocational students take; the characteristics of vocational students.
4	Participation in Postsecondary Vocational Education	The characteristics, educational needs, and reasons for enrollment of those who participate in postsecondary vocational education.
5	Summary and Next Steps	Summary of the key themes from the interim report and the topics and policy questions the final NAVE report will cover.

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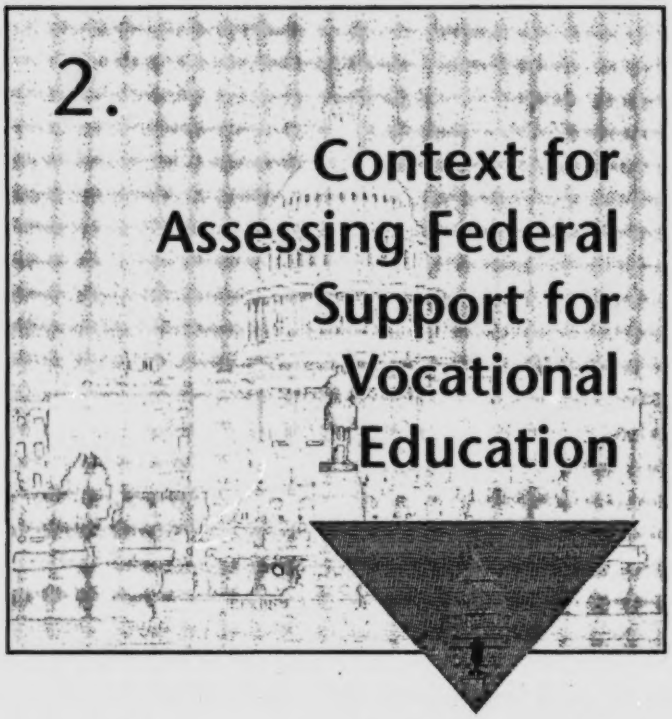

2. Context for Assessing Federal Support for Vocational Education

It has been more than 80 years since the federal government first committed to vocational education as a national priority. Thirteen reviews, revisions or reauthorizations later, Congress enacted the Carl D. Perkins Vocational and Technical Education Act of 1998 (Perkins III). Each time Congress considered federal aid for vocational education, the outcome reflected an understanding of the economic and education priorities of the time and the nature of the federal role in education. Legislative actions often have sought to push vocational education in new directions.

The upcoming reexamination of Perkins III is likely to be no exception. Policymakers will need to consider prevailing issues in deciding whether and what kinds of changes in law are needed. This chapter reviews several factors that are likely to shape policymakers' considerations for vocational education legislation. These same concerns have guided the design of the NAVE agenda:

1. Key education, labor market, and policy trends.

2. The evolution of federal objectives for vocational education.

key findings ▶

Key Findings

Context for Assessing Federal Support for Vocational Education

- ***High schools increasingly focus on academic reform and college preparation.***

  Nearly every state has set higher academic standards for high school graduation, including exit exams. In part, new requirements reflect students' growing expectation to attend college and their inadequate academic preparation for college-level work. The challenges many students face, including those in vocational programs, in meeting the new standards has raised questions about the role of high school courses lacking clear academic focus.

- ***Most well-paying jobs require postsecondary technical skills.***

  Data from many studies clearly indicate that some postsecondary credential is required for better-paying jobs, even those in technical fields; jobs requiring a vocational associate's degree are among the fastest growing. Thus, demand for postsecondary vocational education is likely to remain strong.

- ***For the past 20 years, Perkins has represented a declining share of federal education budgets, but it is still the largest single source of U.S. Department of Education (ED) funds spent on high schools.***

  Perhaps because the primary objective of vocational education has not appeared well aligned with other federal education priorities, increases in Perkins appropriations have not kept pace with either inflation or the expansion of other ED programs and the overall ED budget. As a result, vocational education appropriations shrank from about 6 percent of ED funds in 1980 to less than 3 percent in 2002. Still, comparing dollars spent at the high school level, vocational education appears to be of equal federal priority as other programs focused on raising academic achievement and preparing students for college.

- ***Over time, legislative changes have broadened—not clarified—the goals of vocational education.***

  According to Perkins III, vocational education now must contribute to academic achievement, technical competency, school completion, college attendance, and employment. Federal policy does not prioritize these objectives in promoting program implementation nor in judging the program's success.

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Overarching Education, Labor Market, and Policy Issues

External trends can affect vocational education in several ways. They can point to problems in society or areas of public underinvestment that federal legislation can help to address. They can also underscore conflicts in priorities that may impede implementation of vocational education or legislative effectiveness. Because it straddles the education and job-training systems, secondary and postsecondary institutions, and local, state, and federal agencies, vocational education legislation is always influenced by the larger education, labor market, and policy considerations.

High schools increasingly focus on academic improvement and college preparation.

Nearly 20 years ago, the *Nation at Risk* report identified a "sea of mediocrity" in education and called for a commitment to improving academic performance as a gateway to college and careers. Several trends have been evident since then.

- ***Academic reform dominates the high school agenda.*** Academic performance at the high school level has become a significant concern. The National Assessment of Educational Progress (NAEP) shows little gain since the 1970s in test scores (Campbell, Hombo, and Mazzeo 2000), and the recent Third International Mathematics and Science Study (TIMSS) underscores the poor math performance of American 12th-graders relative to those in other countries (Wirt et al. 2000, pp. 28–29).[1] Nationally, the high school graduation rate has declined (Kaufman 2001), with many nongraduates eventually obtaining GEDs or other alternative certificates that have less value in the labor market than traditional high school diplomas have (Boesel, Alsalam, and Smith 1998).

  Partly in response to this evidence, nearly every state has established new and higher standards for high school graduation. These include increases in total credits, academic credits, and the rigor of minimum course taking required for graduation. As of the 1998–99 school year, 19 states had established high-stakes exit exams for high school graduation, and nine other states were developing such exams (Council of Chief State School Officers 2000). The prospect that large numbers of students, including those in vocational programs, could fail to meet new standards has raised questions about the role of high school courses lacking clear academic focus. These concerns also have led to a hypothesis that student enrollments in elective courses such as vocational education will decline sharply.

[1]Results from the Third International Math and Science Study indicate that, while American fourth-graders do relatively well, outperforming the international average in mathematics, by 12th grade their relative performance drops significantly, outperforming only Cyprus and South Africa.

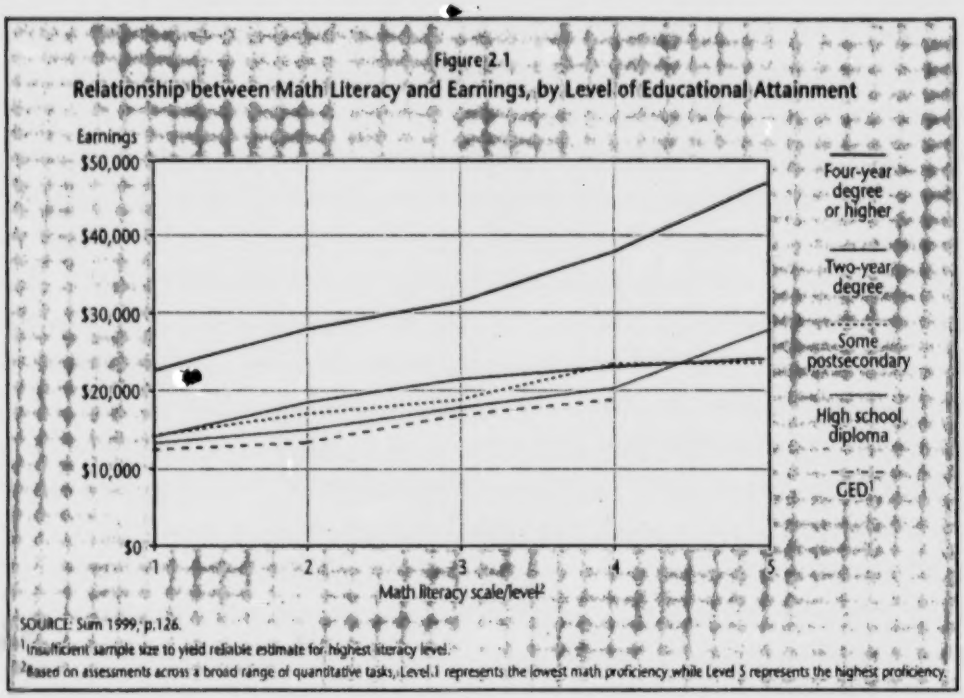
- ***College expectations have been growing, but the need for remediation is large once students get there.*** One reason for the emphasis on academics is the growing belief that nearly all students should, and expect to, attend college—at either a two- or four-year institution. The most recent data indicate that more than 95 percent of 1992 high school seniors reported expecting to attend college (Berkner and Chavez 1997, p. 17); about 80 percent expected to do so immediately after high school and 60 percent planned to earn bachelors' degrees (Sanderson et al. 1996, p. 4). Students' actual behavior does not always follow expectations; about three-quarters of the high school graduates had enrolled in postsecondary education two years later (Berkner and Chavez 1997) and fewer than half of those students—or just over a third of all graduates—are likely to eventually earn their bachelors' degrees (Wirt et al. 2001, p. 152). However, students' educational expectations can influence how they select high school course work.

  High schools' focus on academics also reflects an understanding that inadequate preparation is a serious barrier to success in college. The best available data, collected in the 1980s before the recent increases in college attendance, suggest that nearly half of those enrolled in four-year colleges, and slightly more than 60 percent of those at community colleges, took some remedial course work (Wirt et al. 2000, p. 152). Another measure, still high, puts the figures at one in five and two in five entering freshmen at each type of institution, respectively (Smith et al. 1997, p. 102). Students who have taken remedial course work are much less likely to persist and eventually earn a college degree than are other students (Wirt et al. 2000, p. 52).

  The gap between students' expectations, their level of preparedness for college during their last years in high school, and what they ultimately may do after graduation poses a dilemma for teachers and counselors. Although high school vocational education has often been viewed as a way to provide job skills for those not going on to college, at the time when students actually choose electives, nearly all still say they plan to attend college. Moreover, some guidance counselors, fearful of discouraging students from aiming high, may be reluctant to suggest that students acquire backup occupational skills while in high school should their college plans fail to be realized.

- ***Academic skills are also important for employment and earnings.*** Students with higher-level math skills earn substantially more—as much as 108 percent more—than do students with the same level of educational attainment but weaker skills (Figure 2.1). A similar pattern exists with regard to reading skills. Other analyses indicate that jobs with the highest literacy requirements are growing faster than those with the lowest requirements (Barton 2000, p. 14). Thus, even students who enter the job market directly out of high school must have a strong foundation of academic competencies.

Figure 2.1
Relationship between Math Literacy and Earnings, by Level of Educational Attainment



SOURCE: Sum 1999, p.126.
[1]Insufficient sample size to yield reliable estimate for highest literacy level.
[2]Based on assessments across a broad range of quantitative tasks, Level 1 represents the lowest math proficiency while Level 5 represents the highest proficiency.

Most well-paying jobs require technical skills that can be obtained through postsecondary education.

High- and low-paying employment are both available, but a postsecondary credential of some kind is required for the better-paying jobs. In decades past, high school graduates were able to get well-paying jobs in manufacturing and other occupational sectors. Few such jobs exist today, although as recently as two years ago some vocational educators claimed that a high school graduate with solid information technology skills could do quite well in the computer industry. The evidence indicates that for most students, the skills and credentials acquired in college are, by far, the best route to good wages.

- ***Postsecondary education matters.*** Job projections through 2008 indicate that among the 30 job categories with the largest expected growth, all those requiring at least an associate's degree (with the exception of social worker) are in the highest quartile of median earnings (Braddock 1999, p. 73). Although many job opportunities are projected in fields that require only short-term on-the-job training beyond high school, none of these is in the highest quartile of median earnings, and most are in the lowest quartile (jobs paying less than $7.76 per hour).

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- ***Occupational and technical skills and credentials that can be acquired at the sub-baccalaureate level are in demand.*** Employment growth in occupations requiring a vocational associate's degree is higher than overall employment growth. The Bureau of Labor Statistics projects a 14.4 percent increase in employment across all occupations between 1998 and 2008 but double that rate of increase—30.9 percent—in those jobs requiring a vocational associate's degree (Erard forthcoming). Other analyses suggest that the job market values technical skills in general (Bishop 1995).[2]

Competing policy objectives are likely to broaden reauthorization debates.

Perkins will be examined in light of these education and economic trends and also from the point of view of current federal priorities. Taken together, several policy indicators suggest that more than modest changes to Perkins may be considered.

- ***Smaller relative funding increases for Perkins may indicate that policy priorities are elsewhere.*** Federal budgets are widely regarded as a basic indicator of policy priorities. Although appropriations for the Perkins Act and its predecessors increased over the last two decades, this increase has kept pace with neither inflation nor the expansion of other Department of Education (ED) programs and ED's overall budget.[3] In fiscal year 1980, funding for vocational education represented about 6 percent of total ED appropriations; it is now less than 3 percent (Figure 2.2). This trend suggests that, for two decades, vocational education may have been viewed as less worthy of federal investment than other areas, perhaps because its primary objective does not appear well aligned with other priorities.

- ***Perkins is the largest single source of Department funds used at the high school level*** (Figure 2.3). ED funding that goes to secondary vocational education is greater than the funds spent in high schools either by Title I of the Elementary and Secondary Education Act or by the TRIO (college preparatory) program, or only slightly less than the two other programs combined.[4] Thus, as far as high schools are concerned, vocational education appears to stand on equal footing in federal policy with academic improvement and college preparation.

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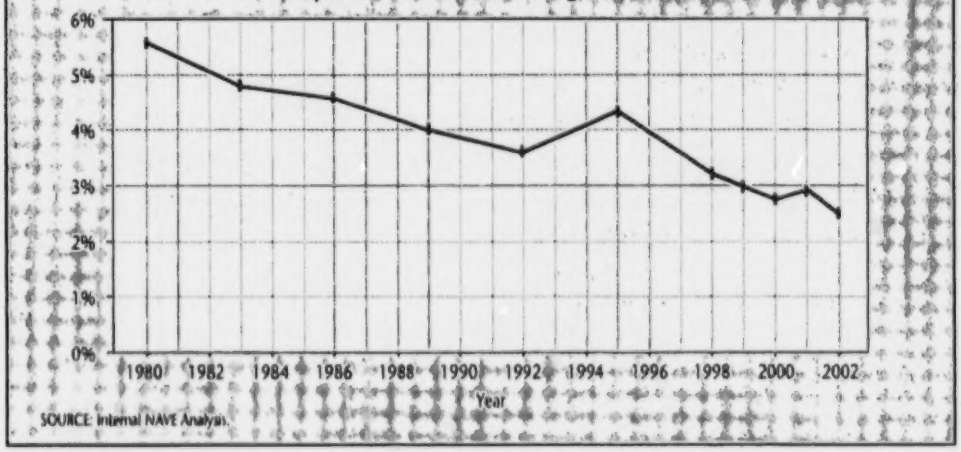
[2]Bishop found a positive relationship between general technical competencies, as measured by the Armed Services Vocational Aptitude Battery (ASVAB) and hourly wages.

[3]In current dollars, vocational education funding increased by 58.6 percent between 1980 and 2001 (from about $784 million to $1.2 billion), compared to a 200.2 percent increase for ED funding overall (from $14 billion to $42.1 billion). In real dollars (converted using the 1996 GDP deflator) over the same period, vocational education appropriations experienced a 17.1 percent decline while overall ED appropriations increased by 57.0 percent.

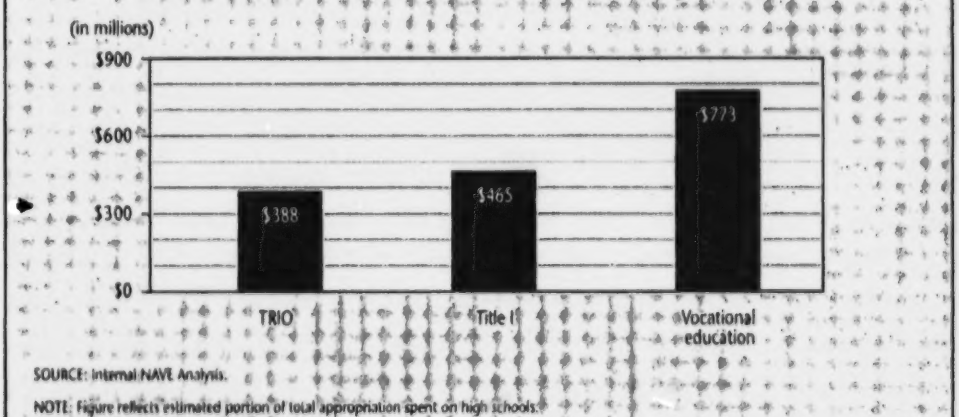
[4]In the case of the Perkins Act and Title I, the amount of federal funds spent on high school activities is determined by state and local agencies. Estimates of national high school spending for these programs were calculated using the most recently available evaluation data. The high school estimate for TRIO includes total spending on the Upward Bound program for high school students and a fraction of Talent Search funds used for high school level programs.

Figure 2.2
Perkins Vocational Education Funding (Appropriations) as a Percentage of Total U. S. Department of Education Budgets: 1980–2002



SOURCE: Internal NAVE Analysis.

Figure 2.3
Selected U.S. Department of Education Spending on High Schools: FY 2001



SOURCE: Internal NAVE Analysis.

NOTE: Figure reflects estimated portion of total appropriation spent on high schools.

- ***Key laws related to workforce development are expiring shortly.*** Several major laws—Temporary Assistance for Needy Families (TANF), the Workforce Investment Act (WIA) and Perkins—are expected to expire in the next two years. Although enacted as separate legislation, Congress envisioned them, particularly WIA and Perkins,

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as complementary and closely connected efforts to streamline the workforce development system. It is too early to determine whether the expected benefits of these laws will be fully realized. However, policymakers may need to consider the tensions that already have emerged between the "work-first," short-term training philosophy that underpins WIA and TANF, and the educational, credential-oriented philosophy that many believe Perkins promotes (D'Amico 2001).

Objectives of Federal Vocational Education Policy

A variety of issues may influence how policymakers think about Perkins reauthorization, but one good starting point is to examine what vocational education was, and is now, expected to achieve. For example, when the Smith-Hughes Act was enacted in 1917, federal aid promoted a single objective: to train high school students for work in factories and on farms.

Later versions of legislation addressed other salient issues. In the 1950s, it was the perceived gap in U.S.-Soviet science and technology following the launch of Sputnik. In the 1960s and 1970s, vocational legislation dealt with youth unemployment resulting from the post-war baby boom, and equity issues raised by the civil rights and women's movements. Concern about U.S. international competitiveness during periods of slow economic growth was a focus in the 1980s. Throughout these periods, however, and for much of its history, vocational education was intended for the large majority of students entering the job market immediately after high school. Employment and earnings were the primary measures of success.

Vocational education today represents a wide range of activities, offered in many types of institutions to a diverse set of students, with different goals. The extent to which state and local implementation reflects the legislative evolution and current federal objectives is a key issue for NAVE.

Current Federal Goals

The most recent phase of federal policy corresponds to a period of great economic benefit for individuals who possess higher-level skills and education, and sharply diminished opportunities for those who are less well educated. The pressing need for improving the academic achievement of all students, reflected in the 1990 Perkins Amendments and continuing in Perkins III, clearly moved federal support for vocational education toward fulfilling a much broader set of objectives than in the past.

These program objectives are conveyed through the stated goals of the law, the strategies it emphasizes, the targeting of funds, and the measures by which the program's effectiveness will be judged. Nowhere is this more clearly identified than in the "Purpose" of the law (Section 2):

> *"The purpose of this Act is to develop more fully the academic, vocational, and technical skills of secondary students and postsecondary students who elect to enroll in vocational and technical education programs...."*

- ***Academic performance.*** Perkins III language indicates the congressional expectation that vocational education will contribute to vocational students' academic improvement. The purpose statement suggests that programs funded under Perkins should assume responsibility for this outcome. In addition, specified "core indicators of performance" for which states will be held accountable include student attainment of: (1) challenging state-established academic skill proficiencies and (2) a school diploma or degree or its equivalent. Perkins intends to support these goals by promoting the integration of academic and vocational education as well as teaching "all aspects of the industry."[5] In theory, these same goals hold true at the postsecondary level.

- ***Vocational and technical competencies.*** Not surprisingly, Perkins is expected to develop students' occupational skills. Not only is attainment of challenging state-established vocational and technical competencies a core accountability measure, but many of the practices encouraged by Perkins are aimed at improving these skills.

- ***Postsecondary education or training.*** Vocational education now must also encourage students to enroll and be successful in further education and training. The Perkins Act promotes stronger links between high school and postsecondary vocational programs through Tech-Prep programs and articulation agreements that enable high school students to earn postsecondary credit in their high school vocational courses. No comparable strategies are specified to encourage postsecondary vocational students to pursue baccalaureate degrees, although Perkins includes further education and training as a core performance indicator for both the secondary and postsecondary levels.[6]

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[5]In addition, Sections 134 (Local Plan) and 135 (Local Use of Funds) of Perkins III refer to grantees' responsibility to strengthen the academic skills of students in vocational programs.

[6]One limited exception is Tech-Prep (Section 205), which requires that special funding consideration be given to consortium applications that "provide for the transfer of Tech-Prep students to baccalaureate degree programs."

- ***Employment.*** What used to be the primary measure of a program's performance is now only one of several equally important indicators.

- ***Access.*** Improving access of potentially at-risk students to high-quality vocational programs has been a longstanding goal of federal policy. Despite the elimination of set-aside grant funds for this purpose, enrollment in nontraditional programs of study is one of the program's core performance measures and states are expected to report on all performance indicators for various special population groups.

Perkins III includes other goals and priorities, sometimes seemingly in conflict. For example, legislative language restricts vocational education to preparation for occupations that do not require bachelors' degrees, yet at the same time encourages preparing students for high-wage, high-tech careers—where four-year college degrees are typically required.

Programmatic Responses: The Changing Face of Vocational Education

Vocational education now has a variety of different missions. Over the past decade, federal legislation and emerging trends have encouraged the field to develop courses and programs reflecting this wider set of objectives, and to target a broader group of students. Aimed primarily at the secondary level, many of these efforts are intended to reduce the stigma traditionally associated with vocational education and to encourage broad career preparation as a beneficial strategy for all students.

These initiatives were supported in various ways by the federal School-to-Work Opportunities Act of 1994. This grant program provided states and local partnerships of educators, employers, and community groups with "venture capital" to initiate strategies that help students develop better educational foundations for long-term career preparation. Although the legislation has expired, many School-to-Work tenets can be found in the "new vocational" strategies.

Strategies geared toward improving academic performance are gaining momentum.

Reflecting the growing pressures of academic reform during the last two decades, two occupationally oriented efforts to strengthen students' academic skills and better prepare them for college have gained substantial attention.

- ***High Schools That Work (HSTW).*** Originally designed by the Southern Regional Education Board (SREB) as a strategy to improve the academic achievement of "career bound" students, HSTW emphasizes raising academic graduation requirements for all students, students' completion of either an academic or career major

or both, new guidance and advising systems, and tutorial assistance for students who need extra help. According to the SREB, HSTW began with 28 sites in 13 states in 1987; it now has been adopted as either a vocational education or comprehensive school reform strategy by more than 1,100 schools in 36 states.

- ***Career Academies.*** Originally developed in the 1970s as a dropout prevention strategy targeted to at-risk students, career academies now serve a more diverse set of goals and student groups. Academies are typically implemented as a school-within-a-school program of two to four years that offers students a sequence of vocational and college preparatory academic course work organized around broad career themes. In collaboration with an academy business partner, students may obtain work experiences, take field trips, or complete school assignments based on the career theme. One recent study estimated that there are between 2,000 and 2,500 efforts called career academies nationwide (Kemple 2001).

Initiatives to improve vocational and technical skills take two different approaches.

Efforts to expand vocational competencies have pursued somewhat separate approaches. One strategy focuses on upgrading the rigor of occupational and technical training.

- ***Skill standards and certification.*** For nearly a decade, efforts to develop national skill standards and portable credentials for many occupations have received federal, industry, and labor support.[7] These standards were intended to identify the skills required in particular fields and provide a focus for efforts to update vocational curricula. Employers were expected to value the certificates that students earned in the upgraded vocational programs. While the results of the National Skill Standards Board have been limited so far, some national, state, and regional industry groups have produced their own sets of standards which local programs report using. A 1998 survey of School-to-Work partnerships nationwide suggested that 14.6 percent of secondary schools offered students in at least some vocational program certificates denoting mastery of skills identified by industry groups at the partnership, regional, state, or national level (Hulsey, Van Noy, and Silverberg 1999).

  Skill standards and certifications recently have emerged in new ways and in new fields. Perhaps the most prominent new offerings in vocational education are the high-tech Cisco Academies, Microsoft A+, and Novell certification programs, which emphasize the high-wage, high-demand end of vocational education offerings.

[7]The National Skill Standards Board (NSSB), created as part of the federal Goals 2000 Act (1994), was charged with developing a voluntary, national system of skill standards, assessments and certifications. Even before the NSSB was formed, the U.S. Departments of Education and Labor funded 22 industry groups with similar objectives.

- ***Youth apprenticeships.*** Developed as a precursor to the School-to-Work program, youth apprenticeships are multi-year programs of academic and vocational courses combined with work experience. Offered as preparation for a specific occupational area, youth apprenticeships are designed to lead to related one- or two-year postsecondary programs, entry-level jobs, or registered apprenticeship programs leading to journeyman status. A 1996 survey suggested that as many as one in five high schools offered at least one youth apprenticeship program (Visher et al. 1998).

An alternative approach has been to *broaden* the content of the occupational training rather than to deepen it. One perspective holds that as individuals have become more likely to hold multiple jobs during the course of their working lives, focusing vocational education on specific entry-level positions is less sensible. Several initiatives try to give students wider exposure to the career or industry around which their vocational studies are organized.

- ***All aspects of the industry.*** Since 1990, the Perkins Act has emphasized teaching about the diverse set of issues and occupational pathways related to a particular industry or career focus (including financial, management, technology, and environmental roles and responsibilities). The 1998 School-to-Work partnership survey indicated that as many as half of all secondary schools have made efforts to introduce "all aspects" into at least some of their vocational curricula (Hulsey, Van Noy, and Silverberg 1999).

- ***Career majors or pathways.*** Promoted in the School-to-Work Opportunities Act of 1994, these were to be defined sequences of relevant academic and vocational courses that students could commit to follow based on their career interest. The vocational content of the majors was expected to be broad, allowing students a wide set of postsecondary options. This definition easily overlaps with those of other career-focused programs, such as career academies and youth apprenticeships. In the 1998 School-to-Work survey, nearly half of all partnership schools reported forming career majors of some type around written course sequences used to help at least some students make course selections (Hulsey, Van Noy, and Silverberg 1999).

Tech-Prep is the primary strategy for improving transitions to college.

The growing emphasis on preparing all students to continue their education beyond high school has led to special efforts to encourage stronger ties between secondary and postsecondary vocational education.

- ***Tech-Prep.*** Tech-Prep was originally designed as a four-year program of related academic and vocational course work spanning the last two years of high school and first two years of community college in order to prepare students for technical careers. Rarely implemented in this programmatic form, many schools instead have focused on establishing articulation agreements that allow students to earn college credit for high school vocational course work that meets college standards (Hershey et al. 1998). Since 1990, Perkins legislation has set aside specific funds to support Tech-Prep. A 1996 survey suggests that about half of all high schools offer a Tech-Prep initiative of some sort (Visher et al. 1998).

Relatively few new approaches explicitly aim to increase employment.

The newer initiatives typically have shied away from the traditional outcome of vocational education: to help students obtain a good entry-level job after high school. Even where workplace experiences have been promoted, their purpose is often described as an opportunity for students to apply their academic learning or gain broader exposure to a particular field while they are in high school, rather than as an explicit strategy for finding employment. There are some exceptions:

- ***Youth apprenticeships.*** In many youth apprenticeship programs, the substantial commitment of employers to provide training or paid work experience is at least partly based on the hope that successful student participants will remain with the firm.

- ***Cooperative education.*** Cooperative education has been available to vocational education students for many years. In an organized co-op, students earn school credit for work experience and typically there is an agreed upon training plan for the students' time at the workplace. It is not unusual for a student to continue to work at their co-op placement after high school. About half of all secondary schools in 1996 offered co-op experiences (Visher et al. 1998).

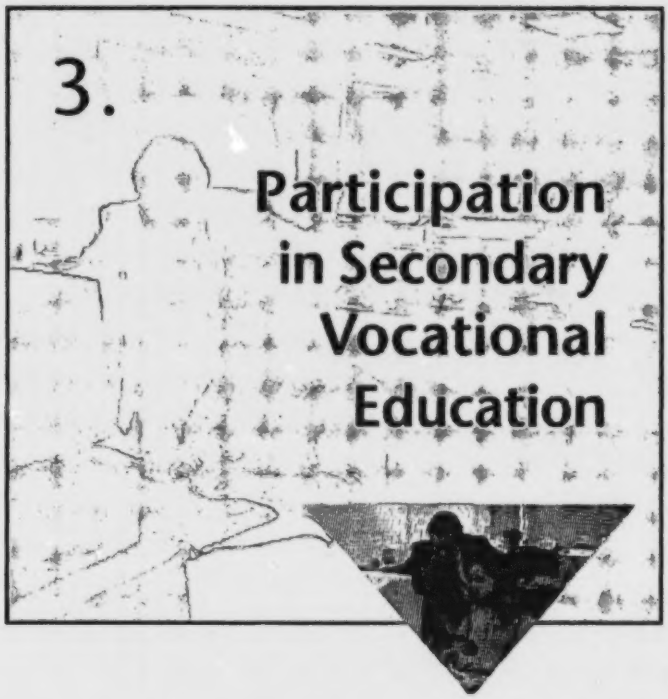
The result of these varied vocational efforts is a field that continues to evolve. New terminology abounds; in fact, the field now refers to itself as "Career and Technical Education (CTE)" rather than vocational education. Some programmatic strategies overlap; many are implemented in combination or as separate options within the same school. Certainly, in many places vocational education has moved far beyond construction and cosmetology. Exactly what vocational education does look like and how much it truly has changed on a broad scale is less clear but will be explored in the NAVE final report.

Implications

As the economy, social conditions, and educational expectations have changed, so too have general perceptions of vocational education's relevance to contemporary concerns. During the past decade, federal vocational education policy has come to embrace an ever-expanding array of goals related to education, employment, and economic development and—perhaps in response—spawned a variety of program offerings. These developments have made vocational education more flexible but left the answers to the following fundamental questions less clear:

- What is the basic objective of federal policy in vocational education?
- For whom is vocational education intended?
- What are the key strategies by which objectives are to be achieved?
- How should the program's success be measured?
- Can vocational education be expected to meet all of these goals?

3. Participation in Secondary Vocational Education



One concern increasingly raised by policymakers is whether vocational education is still relevant to the core mission of secondary education. While part of this question requires examining the quality and impacts of vocational education, participation trends are also a key indicator. Patterns of participation signal some sense of priorities—on the part of schools that must decide to offer vocational courses and programs, of students who choose to enroll in them, and of parents who oversee student selections.

This chapter examines three questions regarding participation in secondary vocational education:

1. Has the nature of vocational course taking changed during the past 15 years?

2. Are vocational students taking more—and more challenging—academic courses?

3. Who participates in vocational education? To what extent are these courses and programs attracting the same, or a different, group of students over time?

key findings ▶

Key Findings

Participation in Secondary Vocational Education

- ***There is little evidence of a continuing drop in student participation during the 1990s.***

  Despite earlier trends, declines in participation in the 1980s appear to have leveled off during the last decade.

- ***Vocational course work is a declining, though still significant, share of the overall high school curriculum.***

  Even though the extent of vocational course taking steadied in the 1990s, academic course taking increased; as a result, students are spending less of their overall high school experience in vocational education. Vocational education, as a share of average total credits earned, declined from 21.8 percent in 1982 to 17.8 percent in 1990, to 15.9 percent in 1998. Still, in 1998 students earned more credits in vocational education (4.0) than in math (3.4) or science (3.1).

- ***Like other students, those in vocational programs are now earning more academic credits, but these vocational students still take fewer and less rigorous academic courses.***

  During the 1990s, the gap between vocational and other students in the number of academic credits earned dropped from 1.6 to 1.1 credits. However, substantially fewer vocational students (about 26 percent) than other students (43 percent) complete the advanced course work considered a "college preparatory" curriculum.

- ***Vocational education serves a relatively diverse and consistent set of students.***

  For the most part, there has been little change in who participates in vocational education during the last decade. Although vocational education serves a varied group of students, those with low prior academic achievement, with disabilities, who are male, from lower-income or rural schools, and proficient in English continue to participate more substantially than do other students. However, some evidence suggests that, over time, vocational education may be serving relatively more academically advantaged students.

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Background

Far more than academic subjects, secondary vocational education is provided in diverse ways in a varied set of institutions. Available data cannot measure participation along all these different dimensions, but understanding where and how vocational education is offered is important background for interpreting participation.

Vocational Course Work and the Institutions That Offer It

The best evidence suggests that, in 1998–99, vocational programs were offered in at least 11,000 public secondary schools (roughly 66 percent of such schools nationally), including 9,450 comprehensive high schools, and 1,800 vocational schools (Phelps et al. 2001). Vocational schools include two types. The first type, vocational high schools, emphasizes vocational instruction but also offers the full set of academic courses required of a high school curriculum; students spend their full day at the school. The second type, area or regional vocational schools or centers (AVSs), usually provides only vocational instruction; students typically attend part-time and receive their academic instruction at their home high school. Compared to comprehensive high schools, both types of vocational schools are considered by many to offer higher-quality occupational instruction because of their superior equipment and facilities and the greater depth and breadth of training available at these specialized institutions. However, most secondary vocational education is provided in comprehensive high schools (Boesel et al. 1994b, p. 3).

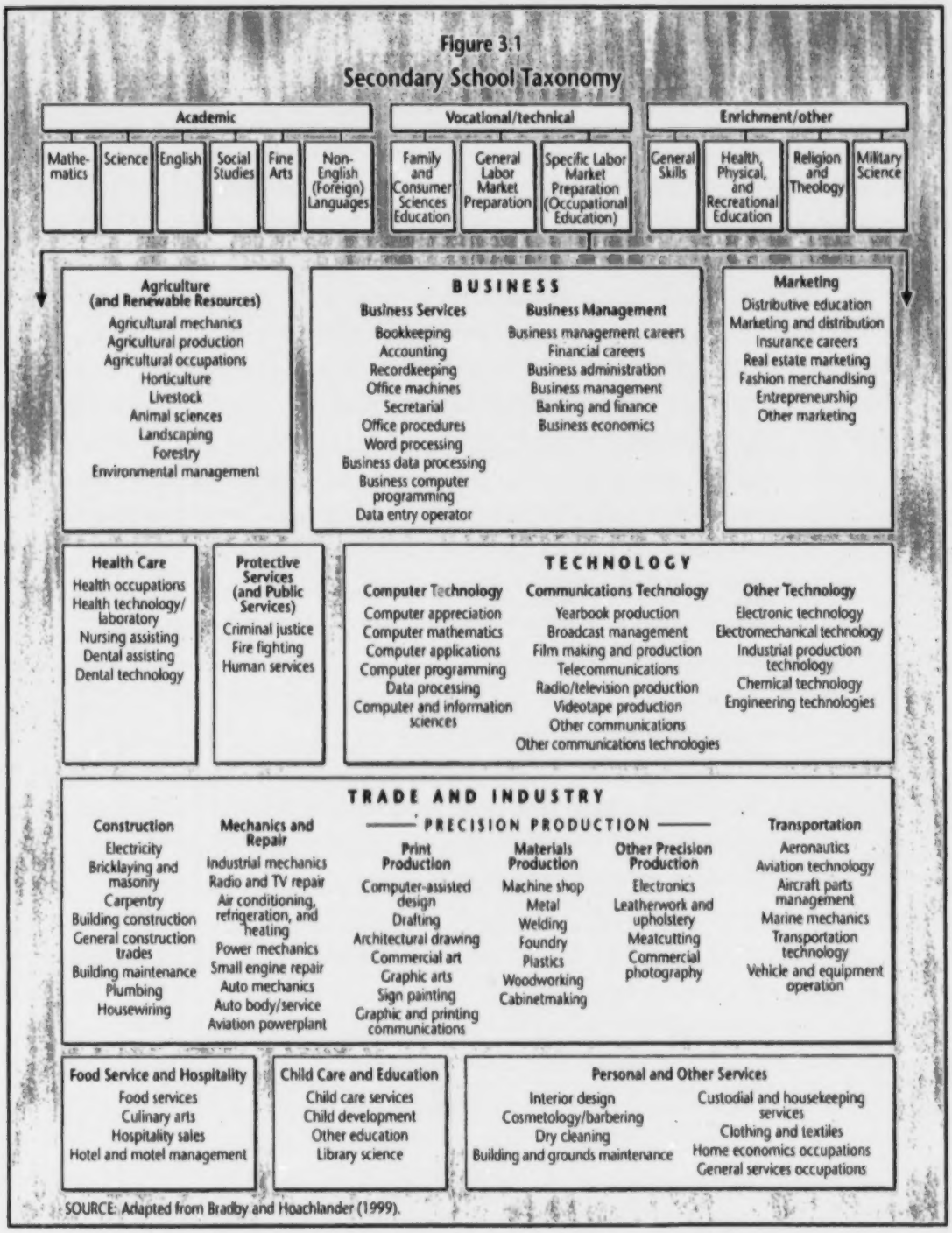
Regardless of where it is offered, secondary vocational education encompasses three types of courses (Figure 3.1):

- ***Specific Labor Market Preparation ("occupational education"):*** Teaches skills and knowledge required in a particular occupation or set of related occupations, such as health, business, food service and hospitality; 10 broad occupational program areas were defined by the National Center for Education Statistics (NCES), some with subspecialty areas.[1]

- ***General Labor Market Preparation (GLMP):*** Provides general employment skills that are not specific to any particular occupational area, such as typing or keyboarding, introductory technology education, career education, and general work experience courses.

[1]The U.S. Department of Education's Office of Vocational and Adult Education (OVAE) is developing an alternative to the NCES vocational program classification system, but it is not yet completed.

Figure 3.1
Secondary School Taxonomy



SOURCE: Adapted from Bradby and Hoachlander (1999).

- ***Family and Consumer Sciences (FCS):*** Intended to prepare students for family and consumer roles outside the paid labor market, including consumer and home economics.

Students take these courses in varying numbers, and with different objectives in mind. Many schools offer sequences ("programs") of related, increasingly advanced courses in one or several specific occupational areas (e.g., health, drafting, child care). However, actual course taking does not necessarily follow these organized offerings. Most vocational courses and programs have no prerequisites; students are free to enroll in courses across occupational areas and levels, although some choose to focus their course taking on a single occupation (Boesel et al. 1994b, pp. 85–87). The exceptions are specialty programs like career academies and youth apprenticeships, in which students' decisions to enroll in the programs are at least tentative commitments to follow the programs' defined course sequences.

Key Measures of Participation

Because students in the nation's secondary schools take vocational education courses in varying numbers and sequences, it is difficult to identify a group for evaluation purposes whose participation and outcomes would be best to measure.[2] Previous research has focused on "occupational concentrators"—students who take three or more credits (corresponding to approximately three, year-long, single-period courses) within a single occupational program area—because they are the closest proxy to program completers and are thought to be most intent on preparing for a job or career.

From a policy perspective, however, concentrators are not the only group of interest. The larger population of all students (43.8 percent) who earn three or more occupational credits, of which concentrators are a subset, is also important. Perkins grants are distributed to institutions—districts and schools—to fund courses and programs not individual students. Therefore the federal investment is similar whether students concentrate their vocational course taking in a single occupational program area (25.0 percent) or "explore" across several areas (18.8 percent). Together, concentrators and explorers account for the vast majority of credits earned in vocational or occupational education (Figure 3.2).

To better assess the nature of vocational course taking, the remainder of this report will examine several ways in which students can participate (Table 3.1).

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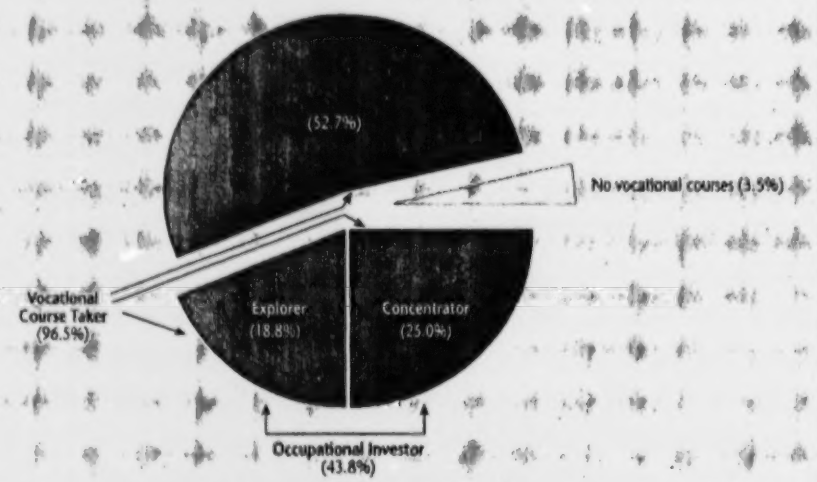
[2]Historically, students could be clearly distinguished by the "track" or set of courses in which they participated—college preparatory, vocational, and general. However, these labels and the patterns of course participation they represent are no longer clear cut.

Figure 3.2

Percentage of Students Meeting Different Definitions of Vocational Participation: 1998



SOURCE: Levesque 2001: Analysis of National High School Transcripts.
Percentages may not add to 100.0 due to rounding.

Table 3.1

Key Secondary Participation Measures

Participation Measure	Description
Total credits earned in vocational education	The sum of all credits earned in occupational education, general labor market preparation, and family and consumer science.
Vocational Course Taker	Graduate earning any credits in any form of vocational education.
Occupational Investor	Graduate earning three or more credits in occupational courses, regardless of how these credits are organized; made up of two subgroups (below).
Occupational Concentrator	Graduate earning three or more occupational credits but in a single program area (e.g., health care or business services).
Occupational Explorer	Graduate earning three or more occupational credits but in more than one program area (e.g., business services and agriculture).

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Data

National trends in vocational and academic course taking come from analysis of public high school transcripts for the graduating classes of 1982, 1990, 1992, 1994, and 1998, collected by NCES.[3] These data are too early to capture shifts in participation that may result from Perkins III (passed in July 1998). Also, transcripts do not typically record participation in special programs—such as career academy, youth apprenticeship, or Tech-Prep programs. Nor do transcripts provide information on the type of school at which the vocational courses were taken. Some of this information can be obtained from recent data collections that have not yet been completed or released for public use. If more current (class of 2000) and comprehensive data become available in time, they will be included in the NAVE's final report. The current limitations in the data, however, do not impede the most important types of participation analyses.

Trends in Vocational Course Taking

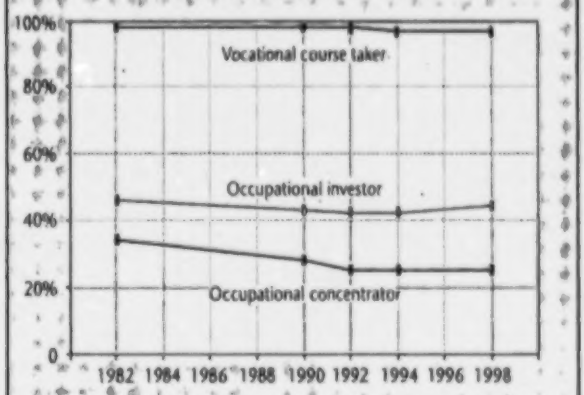
Vocational education has long played a role in students' high school experience. For the last several decades, virtually every student has left high school with at least one vocational course and some have taken many. Some aspects of vocational participation are changing, however. School reforms, evolving social and economic conditions, and other factors are helping to shape the availability of and interest in vocational education programs.

Little evidence of an ongoing drop in student participation.

A common concern in the vocational education community has been that increasing college aspirations and emphasis on academic achievement might reduce student participation in vocational education. However, at least through 1998, student involvement has not decreased as dramatically as these concerns and some earlier reports seemed to predict (Levesque et al. 2000). The most commonly used measure of participation indicates that a decade of decline through the 1980s appears to have leveled off; the share of occupational concentrators fell substantially between 1982 and 1992 but has been fairly steady since then, at about one quarter of all high school graduates (Figure 3.3).

[3]These data have both advantages and limitations. Nationally representative data collected and coded in a uniform manner allow researchers to construct definitions of student participation that are consistent across states and localities. However, transcripts cannot provide reliable information about exactly what is taught in or what students learned from a course, nor do they indicate students' participation in special career-related programs such as career academies, Tech-Prep programs, or youth apprenticeships.

Figure 3.3
Percentage of Students Participating in Vocational Education: 1982–1998



SOURCE: Levesque 2001. Analysis of National High School Transcripts.

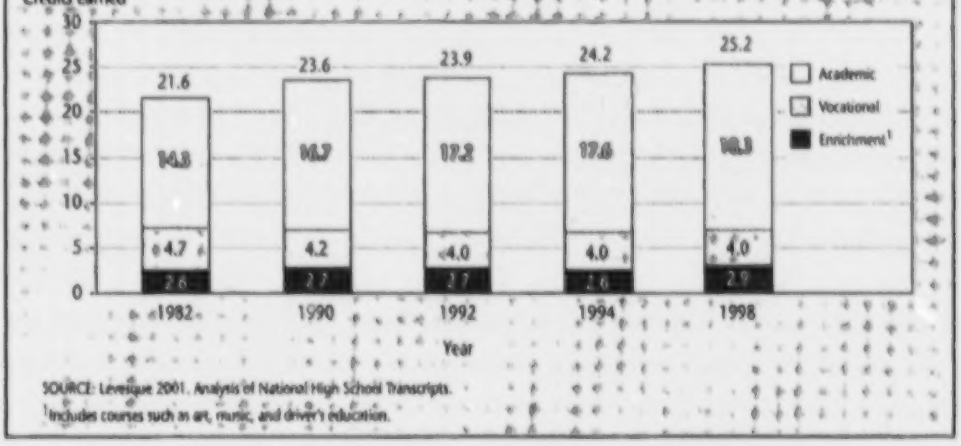
Perhaps more importantly, researchers have typically ignored the larger share of students who take at least three occupational credits ("investors"), of which concentrators are only a subset. Examining the trends in this broader measure suggests that, in fact, there has been little change over the past 15 years. Between 42.0 and 46.2 percent of all high school graduates since 1982 have invested in vocational education in this way. In part, this level of participation in occupational courses has been maintained because increasing numbers of students are taking at least one computer technology course, at the same time that enrollments in some other occupational program areas have declined.

Vocational course work is a declining, though still significant, share of the high school curriculum.

Despite relatively stable student participation rates over the last decade, however, vocational education is clearly a shrinking portion of the way students spend their time in high school (Figure 3.4). Average credits earned in vocational education fell from 4.7 in 1982 to 4.0 in 1992 (mostly the result of fewer keyboarding or typing classes in high school) and remained steady at 4.0 credits through 1998.[4] At the same time, academic credits increased substantially—from 14.3 to 18.3, making total credits rise. As a result, vocational education's share of total credits dropped from 21.8 percent in 1982 to 17.9 percent in 1990 to 15.9 percent in 1998.

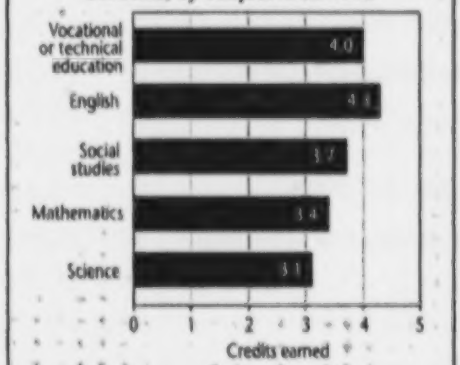
[4]During the period 1982–1998, General Labor Market Preparation courses declined from 1.0 credits to 0.6 credits at the high school level. In particular, many fewer students are taking keyboarding or typing courses in high school, perhaps because these courses are now offered in middle school. In contrast, average credits earned in occupational education—courses such as health, business, trade and industry—have been relatively constant since 1982.

Figure 3.4
Average Credits Earned by High Schools Students, by Type of Course Work: 1982–1998



SOURCE: Levesque 2001. Analysis of National High School Transcripts.
[1]Includes courses such as art, music, and driver's education.

Figure 3.5
Average Credits Earned by High School Students, by Subject Area: 1998



SOURCE: Levesque 2001. Analysis of National High School Transcripts.

Even with the overall declining share, high school students still earn more credits in vocational education (4.0) than in math (3.4) or science (3.1) (Figure 3.5). Moreover, in 1998, the 4.3 English and language arts credits students earned on average are not statistically different from the credits they earned in vocational education. These findings are particularly striking, given the emphasis that has been placed on academic reforms and higher graduation requirements during the last two decades.

Students may now be taking vocational education for different reasons.

Historically, students enrolled in vocational education to prepare for entry-level jobs after high school. Meeting this objective called for skill development in a particular occupational area, and likely encouraged students to "concentrate" their course taking as a way to maximize their appeal to potential employers. Federal law, particularly in Perkins II and III, supported this goal by promoting school implementation of, and student participation, in "sequences" of related vocational courses.

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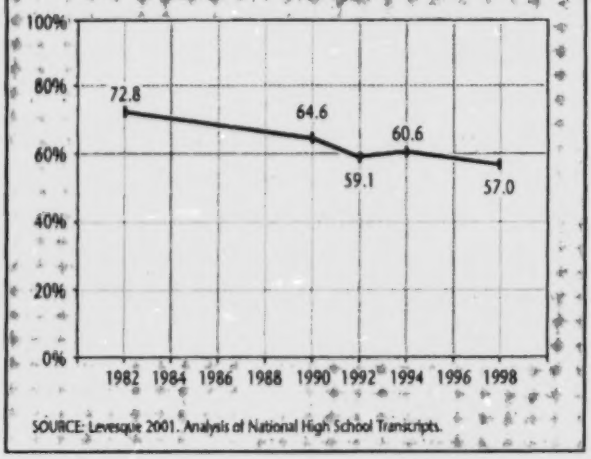
Figure 3.6
Percentage of Occupational Investors Who "Concentrate" Their Occupational Courses in a Single Program Area: 1982–1998



SOURCE: Levesque 2001. Analysis of National High School Transcripts.

Despite these efforts, however, the clear trend in vocational course taking has been toward "exploring" across occupational program areas rather than "concentrating" (Figure 3.6). Among students who earn at least three occupational credits (investors), concentrating is a less common way to organize course work now (57.0 percent) than in 1982 (72.8 percent); a higher proportion of students are taking their three or more credits in multiple program areas. In addition, students are increasingly less likely to take advanced course work in their area of concentration; in 1998, 56.3 percent of concentrators earned credit in related advanced-level courses, down from 69.9 percent in 1982.

These data suggest that fewer students may now view skill development in a specific program area to be their main objective for enrolling in vocational education. Some students may take occupational courses for career exposure purposes, to help them select a college major, to pursue a leisure interest, or because these courses present less of an intellectual challenge than do other courses.

There are several possible, alternative explanations for the change in vocational course-taking patterns. First, schools may be increasingly less likely to *offer* full sequences of related courses, choosing to trade off depth in the programs they offer in favor of giving students more breadth across program areas. Whether student or school preference, however, the priority on specific job skill development appears to be lessening over time.

It is also possible, however, that recent vocational course taking reflects broader conceptions of career preparation. Students may be organizing what appears to them and to their counselors to be a logical sequence of occupational courses representing different program areas as classified by NCES. For example, a student who wants to run a landscaping firm might appropriately enroll in both agriculture and business courses; a stu-

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dent interested in pediatric nursing could view both child care and health care skills as important preparation for later college courses. More analysis of students' reasons for enrolling in vocational education is necessary and will be presented in the next NAVE report.[5]

Full effects of school improvement policies on vocational participation perhaps have not yet been felt; future declines are likely.

Most of the decline in vocational course taking occurred between 1982 and 1990, before many would think the policies associated with school reforms were fully implemented. During the decade of reform efforts since then, vocational participation in the aggregate remained relatively stable, suggesting that these reforms have not had much of an effect.

Looking beyond tabulations of the aggregate participation measures tells a slightly different story, however, which foreshadows possible declines in vocational education course taking.

- ***Course graduation requirements increased only slightly during the 1990s and not across the board.*** While the 1990s often have been referred to as the decade of school reform, certain reform policies that might be expected to affect vocational participation were not as evident during this period. Between 1980 and 1990, approximately 39 states increased their total course graduation requirements, and vocational participation did decline substantially during that time. However, only 12 states increased or further increased graduation requirements between 1990 and 1998 (Education Commission of the States 1990; Snyder et al. 2001).

  Moreover, the six states that increased their requirements by 2.0 credits or more between 1990 and 1998 exhibited: (1) a significant decrease of 1.0 vocational credits earned by high school students and (2) a decline of 9.6 percent in the proportion of occupational concentrators, both statistically significant results (Table 3.2). Many factors could account for the decline in vocational participation in these states, but the significant increase in graduation requirements is certainly a strong hypothesis. Further efforts to raise graduation requirements may well have adverse consequences for participation in vocational education.

[5]NAVE has commissioned a series of focus group discussions with students in order to examine reasons for enrollment in vocational education courses and programs.

Table 3.2
Changes in Vocational Education Participation Measures, by Change in State Graduation Requirements: 1990–1998

	Number of States	Average Vocational Credits Earned			Percent of Graduates Who Are Concentrators		
		1990	1998	Change	1990	1998	Change
Change in Total Graduation Requirements							
Increase of 2 + credits	6	4.1	3.1	-1.00*	30.3	20.6	-9.6*
Increase of LT 2 credits	6	4.5	4.1	-0.4	33.8	28.7	-5.1
No increase	32	4.0	4.1	0.1	24.2	24.0	-0.2
Not applicable[1]	6	4.6	4.2	-0.4	29.5	29.6	0.1

SOURCE: Levesque 2001. Analysis of National High School Transcripts.

[1] States that allowed local school districts to set high school graduation requirements in one or both years.
*Statistically significant at 1.96 critical level for comparison between 1990 and 1998.

- ***Students mostly maintained vocational participation by expanding total credits earned.*** Nationally since 1990, high school students greatly increased their academic course taking while reducing only slightly their vocational credits. If the increase in academic credits reflects schools' emphasis on academic improvement, vocational course taking might have fallen further, if not for the fact that students could make room for additional academic courses by increasing their total credits earned. However, such expansion may have reached its limits by 1998; students on average earned a total of 25.2 credits, out of a likely 28 possible credits in a traditional school schedule (Figure 3.4).[6] Alternative "block scheduling" approaches may allow students to increase their total credits further.

- ***Shifts in vocational course taking do not yet reflect emphasis on preparation for academic assessments.*** A major reform policy that could have a direct effect on vocational participation is the introduction of state assessments. As noted in Chapter 2, by the 1998–99 school year, nearly 20 states had established high-stakes

[6] The maximum of 28 credits was calculated based on the assumption that most high schools offer seven periods of courses each day (1 credit for each year-long course) over four years, for a total of 28 credits. New "block scheduling" approaches can increase the total possible credits earned to 32.

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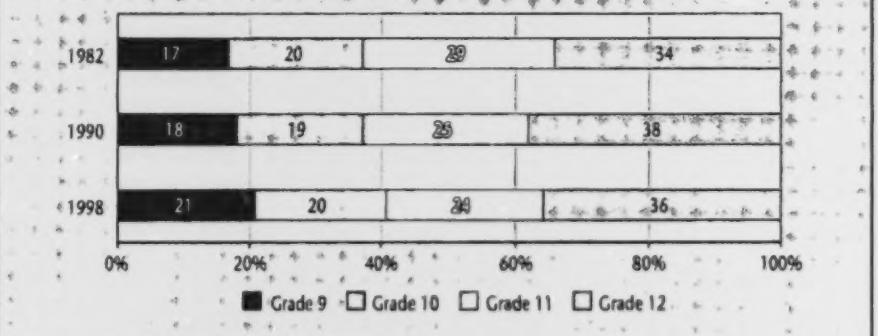
exit exams for high school graduation, typically offered first at the end of 10th grade so that students who fail have several opportunities to retake the tests. One hypothesis was that schools would increasingly focus students in the early high school grades on academic courses and preparation for the assessments, potentially crowding out vocational courses until later in the high school years. Such a shift was not evident between 1990 and 1998, however. During that period, vocational credits earned in 11th grade declined somewhat. As a result, students were taking a similar or slightly higher share of their vocational credits *before* the typical 10th-grade state assessment (Figure 3.7).

Figure 3.7

Percentage Distribution of Vocational Credits Earned, by Grade Level: 1982, 1990, and 1998



SOURCE: Levesque 2001. Analysis of National High School Transcripts.
Percentages may not add to 100 due to rounding.

In fact, by 1998 few states had yet phased in the consequences for students who passed or failed to pass the assessments. The aggregate decline in 11th-grade vocational participation is more likely due to increased graduation requirements in those 12 states that raised them, leading to more academic rather than vocational course taking in grade 11.[7] As assessments become more fully implemented, and if states maintain their high standards for passing, the hypothetical decline in vocational participation is much more likely. One piece of evidence that supports this future scenario is a study (Bishop and Mane forthcoming) that suggests that even the minimum competency exams required for graduation in some states or districts in the early 1990s may have reduced vocational course taking.

[7]Most states, for example, increased the years of math or science (or both) required from two to three, which would most likely affect 11th-grade course taking.

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Participation by Occupational Program Area

Examining occupational course taking by program area is important for two reasons. First, there is a presumption about the quality of programs in different fields: program areas that prepare students for high-skill, high-wage jobs are generally considered more beneficial than those that prepare students for jobs with fewer skill demands and lower pay. A second, and more overarching, concern is that students who invest in vocational education should be able to find jobs. Therefore, some match between vocational program offerings and labor market needs is desirable. Transcript analysis cannot adequately assess quality, so some judgment about program areas is necessary.

Enrollment in computer technology courses does not yet reflect the "Internet boom."

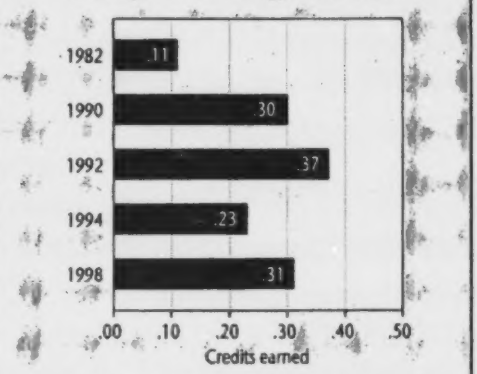
While Perkins III does not emphasize one occupational program area over another, no program has received as much recent attention—by educators, employers, policymakers, and the media—as information technology (IT). By 1998, when Perkins III was passed, the potential of the Internet and the demand for technicians skilled in hardware, computer programming languages and applications seemed limitless. At that time, some high schools and area vocational centers began offering courses that prepared students for certifications in Microsoft office applications, Cisco "networking," or other IT areas.

Between 1990 and 1998, the data indicate that participation in computer technology courses did increase in some ways. During this period, the proportion of high school students taking at least one course rose by 21.1 percent but the proportion concentrating in computer technology (taking at least three credits in this program area) stayed roughly the same. Although the average number of credits earned in computer technology was small (.31), by 1998 34.3 percent of high school graduates took at least one computer technology course.

However, trends in the national transcript data are not consistent with the more recent increased attention and school demand. Average credits earned in computer technology appear to have peaked in 1992, declining afterwards at the same time that employment demands in this area were growing (Figure 3.8). Even if 1992 were an anomaly, the data suggest at most level overall participation through most of the 1990s. Likewise, although computer-related course taking occurs in other program areas—primarily business services and drafting—participation in those courses did not increase markedly during the period.

It seems likely that the available national data, reflecting the course taking of seniors in 1998, is too early to capture the effects of the Internet expansion and school interest in offering IT courses. It is expected that transcripts now being collected for seniors in the class of 2000 will show a marked increase in computer technology participation.

Figure 3.8
Average Credits Earned by High School Graduates in Computer Technology: 1982–1998



SOURCE: Levesque 2001. Analysis of National High School Transcripts.

Other changes in program participation are consistent with labor market trends.

Policymakers have long called for stronger linkages between employers and vocational educators, in part to ensure that the availability and quality of vocational programs reflect employer needs.[8] Perkins III, for example, mandates funding for national and state-level entities to coordinate and disseminate occupational and employment information. However, labor market demand may do more than influence administrative judgments about program offerings; students may be more likely to take courses or concentrate in vocational program areas that prepare them for occupations with increasing job opportunities.

A recent NCES analysis (Hurst and Hudson 2000) supports the hypothesis that vocational course taking may be responsive to labor market demand to some degree (Figure 3.9). A substantial portion of the change in the proportion of concentrators in specific occupational program areas between 1982 and 1998 appears to coincide with projected job growth from 1983 to 1996. For example, four programs experienced the largest gains in the proportion of concentrators: health care, child care and education, food service and hospitality, and technology and communications.[9] During the same period, the corresponding job categories—health service occupations, child care workers and teacher aides, food preparation and service occupations, and technicians and related support occupations—had higher than average employment growth. Similarly, the largest declines in vocational concentrators were in the trade and industry and business program areas; these areas approximately correspond to

[8]Perkins III requires that state plans describe how "vocational and technical education relates to state and regional occupational opportunities" (Sec. 122 (c)(15).

[9]Although enrollments in these program areas grew significantly in relative terms, the absolute number of students participating in these programs is still small.

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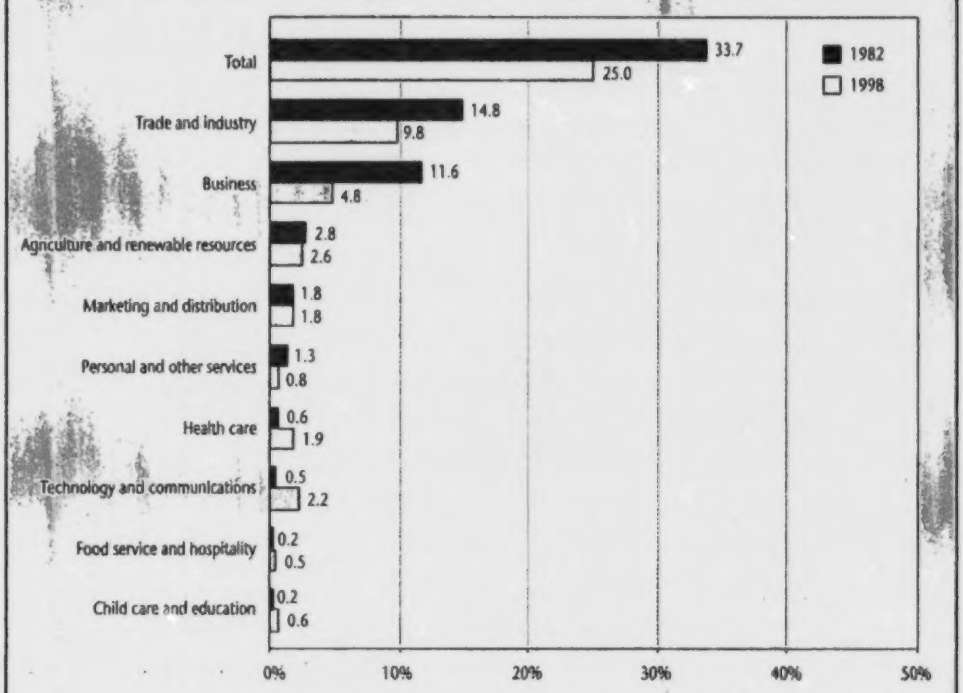
Figure 3.9a

Percentage of Students Concentrating[1] in Various Occupational Programs: 1982 and 1998



SOURCE: Hurst and Hudson 2000. Based on analysis of High School and Beyond (1982) and National Assessment of Educational Progress (1998) Transcripts.

[1]Taking three or more occupational courses in a single program area.

occupations that had experienced below average projected growth rates since the early 1980s. It is unclear whether the consistency in course taking and job growth reflects changes in school program offerings, changes in student preferences, or both.

While some responsiveness to employment trends is desirable, it is worth noting that a substantial share of the recent vocational participation and job growth has been in low-wage sectors. There can be great variation in wages and earnings within each occupational grouping, particularly in the technology and communications fields. However, recent data indicates that in 2000, average annual earnings were $21,040 for health care support workers, $16,070 for food preparation and serving related workers, $18,770 for teacher assistants and $16,350 for child care workers (Bureau of Labor Statistics 2001). Although these occupations are certainly important to society, the data provide little evidence that vocational education is concentrating its efforts on preparation for high-skill, high-wage jobs.

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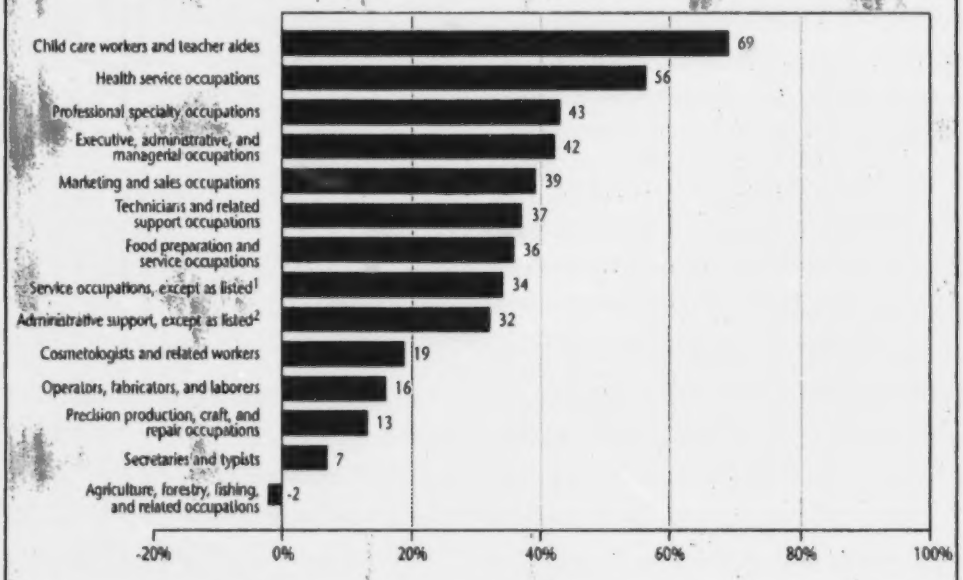
Figure 3.9b
Percentage Change from 1983 to 1996 in Number of Jobs, by Occupational Grouping



SOURCE: Hurst and Hudson 2000. Based on U.S. Department of Labor, Bureau of Labor Statistics, National Industry-Occupational Employment Matrix 1983–1996 Time Series.

[1]Excludes health service occupations; homemaker-home health aides; child care workers; food preparation and service occupations; and cosmetologists and related occupations.

[2]Excludes secretaries, typists, and teacher aides.

Academic Course Taking of Students Participating in Vocational Education

With academic improvement increasingly the marker of a high school's success, policymakers have sought to ensure that students who participate in vocational education are not left behind. Perkins III accountability provisions, for example, require states to report on the proportion of vocational students who meet state-established academic standards.

Vocational educators and their academic colleagues face certain challenges. Historically, many of the occupational concentrators and other students who take at least three credits of occupational education have *entered* high school with lower academic achievement than other students (Table 3.3). It therefore should not be surprising if vocational students' academic course taking follows a different path than that of other students, as described below.

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Table 3.3
Percentage of 1992 High School Graduates, by Level of 8th-Grade Math and Reading Achievement Test Scores

	Occupational Concentrators	Non-concentrators[1]
Average math score		
Low	44.6	29.7
Middle	36.0	33.4
High	19.4	36.9
Average reading score		
Low	47.4	28.9
Middle	33.7	34.1
High	18.9	37.0

SOURCE: Agodini forthcoming. Analysis of NELS 88 data.

[1] Among the non-concentrators, those who earned three credits in occupational vocational education but who did not "concentrate" their course taking (i.e., the "explorers") had math and reading test scores closest to the concentrators.

Vocational students, like other students, are earning more core academic credits than in the past, but a gap remains.

More than a decade of attention to school reform appears to have helped improve the academic course taking of all students, including those who participate in vocational education. Public high school graduates earned 2.6 more core academic credits—in English or language arts, mathematics, science, or social studies—in 1998 than they did in 1982 (Table 3.4). This increase is equivalent to about two and one half full-year academic courses.

Table 3.4
Academic Credits Earned by High School Graduates: 1982 and 1998

Type of Students	Average Academic Credits Earned, by Year		
	1982	1998	Change
All public high school graduates	11.9	14.5	+ 2.6
Occupational concentrators	10.8	13.7	+ 2.9
Non-concentrators	12.4	14.8	+ 2.4

SOURCE: Levesque 2001. Analysis of National High School Transcripts.

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Occupational concentrators increased their academic course taking even more than other students, perhaps because they had farther to go in meeting new graduation requirements. As a result, by 1998 the gap in academic credits earned between occupational concentrators and non-concentrators had been reduced (from 1.6 to 1.1 credits). Most of the remaining gap is due to differences in science course taking.

Vocational students still take less rigorous courses than other students do.

Despite the success in increasing the *number* of academic courses that vocational students take, not as much progress has been made in narrowing the gap in the *types* of courses they take. During the 1990s, concentrators and other students became more similar in their taking of such "gatekeeper" courses as Algebra 1 and in whether they completed what has been termed, "the New Basics" curriculum—four years of English and three years each of math, science, and social studies. However, in 1998, occupational concentrators were much less likely than non-concentrators to complete a more demanding college prep curriculum or to take advanced math (Table 3.5).

Table 3.5
Academic Course Taking Patterns for Occupational Concentrators and Non-concentrators: 1998

Course Taking	Occupational Concentrators	Non-concentrators[1]
New Basics[2]	45.7%	59.4%
College Prep Curriculum[3]	25.9%	43.2%
Algebra 1	87.1%	93.2%
Advanced Math[4]	26.0%	42.4%

SOURCE: Levesque 2001. Analysis of National High School Transcripts..

[1]Among the non-concentrators, the academic course taking of those students who earned three credits in occupational vocational education but who did not "concentrate" their course taking ("explorers") was most similar to that of the concentrators.

[2]The "New Basics" curriculum, as measured here, is equivalent to four years of English or language arts, and three years each of math, science, and social studies.

[3]The "College Prep" curriculum is defined as earning four or more credits in English; three or more credits in mathematics at the algebra 1 or higher level; two or more credits in biology, chemistry, or physics; two or more credits in social studies with at least one credit in U.S. or world history; and two or more credits in a single foreign language (see Levesque et al. 2000).

[4]"Advanced Math" includes algebra 3, trigonometry, analytical geometry, linear algebra, probability, statistics, precalculus, introduction to analysis, and calculus.

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This disparity in the rigor of course taking raises some concern. Because many students who pursue vocational education as a major part of their studies begin high school with lower levels of academic achievement, if they then take less challenging academic courses they are more likely to have difficulty passing state academic assessments required for graduation. These problems have already become evident in states such as New York and Massachusetts, where some local vocational educators have lobbied for a separate set of passing standards or what they view as more relevant tests for vocational students. The comparatively low rate at which vocational students complete a college preparatory curriculum is also a consideration for the future of vocational education, as more and more students aspire to baccalaureate degrees.

Characteristics of Vocational Education Students

Who participates in vocational education has been a continuing policy concern. While federal legislation in the 1960s and 1970s aimed to improve access to vocational education for certain special populations, the current debate is whether vulnerable groups are overrepresented in and well-served by vocational education. Some previous reports suggested that, by the early 1990s, vocational education had come to be stigmatized as a high school track for students with poor academic capabilities, special needs, or behavioral problems (Boesel et al. 1994b).

During the last decade, however, career education has been given new prominence by several initiatives targeted to students other than those traditionally served by vocational programs (see Chapter 2). In addition, some states and districts have worked to strengthen the appeal of vocational courses—for example, moving away from training for what used to be considered blue-collar jobs, such as manufacturing, secretarial work, and child care, and toward programs in pre-engineering, information technology, and education.

Policymakers and educators remain committed to providing students from special populations access to vocational education. However, many believe that the quality of vocational programs is unlikely to improve without attracting a broader segment of the student population or that the participation of a more diverse set of students will signal that quality improvements are being made.

For these reasons, it is important to examine the characteristics of students involved in vocational education. While a variety of characteristics were analyzed, particular attention was paid to those that define the special population groups named in Perkins III (P.L. 105-

332, Section 3(23)) and that can be identified in available data (Table 3.6).[10] The participation of two other groups defined in the law—single parents and displaced homemakers—could not be addressed with the current data and are probably more important to examine at the postsecondary level.

Table 3.6
Measures Used to Define Special Population Groups

Special Population Group	Measures Used
Individuals with disabilities	Students with Individual Education Plans
Individuals from economically disadvantaged families	Students in schools in which more than 50.0 percent of students are eligible for the National School Lunch Program
Individuals preparing for nontraditional training and employment	Students in occupational programs that are nontraditional for their gender
Individuals with other barriers to educational achievement, including individuals with limited English proficiency (LEP)	Students who: (1) take low-level math in 9th grade (proxy for prior achievement) or (2) are limited English proficient (LEP)

Historically, low college aspirations, prior achievement, and socioeconomic status have been the strongest predictors of participation in vocational education.

Vocational education has long struggled with the perception that it mostly serves students who are disadvantaged in some way—who have no plans for college, are struggling academically, are disabled, are low-income, exhibit behavioral problems, or are from minority racial or ethnic groups. Previous studies have contributed to this impression, but most have relied primarily on qualitative impressions from school site visits and descriptive statistics of seniors who meet certain thresholds of participation. These efforts provide a useful picture of participants. However, few have explored how the various student characteristics are related to each other in determining who participates. Prior research has also failed to identify which characteristics or factors make the greatest difference in attracting students to vocational education or, as some see it, in how school counselors encourage students into high schools' various curriculum paths.

[10]Unfortunately, transcripts do not contain many indicators of student characteristics; some measures were constructed based on the characteristics of the students' school.

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A recent study commissioned for NAVE suggests that several of the factors previously thought to influence participation do matter, while others may not (Agodini, Uhl, and Novak forthcoming). Using multivariate regression techniques so that many characteristics could be simultaneously taken into account, the study estimated the relationship between each factor or characteristic and whether or not a student became an occupational concentrator. The analysis indicates (Table 3.7):

- ***Low prior academic achievement is associated with participation in vocational education, but it is not the only factor that has an effect.*** Consistent with earlier research, low 8th-grade test scores are highly correlated with becoming an occupational concentrator, investor, or explorer, even taking other characteristics into account. However, among students with similar 8th-grade scores, many other factors also affect the program of study the students pursue.

- ***College plans have the strongest relationship with vocational education participation.*** Regardless of their demographic characteristics, disability status, prior achievement, or behavior in school, students who in 8th grade did not plan to pursue postsecondary education were more likely (by about 15 percentage points) to become occupational concentrators than those who planned to earn baccalaureate degrees. This finding suggests that, for many students, vocational studies may be a planned strategy for life after high school.

- ***Socioeconomic status (SES) has an independent effect on participation.*** Even among those with similar prior achievement, college plans, and other characteristics, students from lower socioeconomic backgrounds are more likely to participate in vocational education than are students from higher socioeconomic backgrounds. This result suggest that low-income students regardless of academic ability, are more likely to choose or be encouraged to choose vocational programs of study.

- ***Disabilities, problem student behaviors, and minority racial or ethnic statuses do not appear to increase the likelihood that students participate in vocational education, as some other studies have suggested.*** Certainly, a higher proportion of students with disabilities, problem behaviors, and minority status participate in vocational education than do other students. However, in contrast to previous research examining participation rates (e.g., Levesque et al. 2000), once prior achievement, SES, and college plans are controlled for, disability is no longer a factor. The same is true when examining the role of problem behaviors, such as tardiness, class cutting, and suspensions. Although some studies of a few select high schools have suggested that African American and Hispanic students are more likely to be counseled into vocational programs, on a national level students from minority racial

Table 3.7

Factors Related to Becoming an Occupational Concentrator

	Overall 1992 High School Graduates	Student Subgroups		
		Low Achievers	In Poor Schools	Non-College Bound
Demographics				
Sex (male v. female)	+	+		+
Race/ethnicity (black or Hispanic v. white/other)		-		
Socioeconomic status (low v. high)	+	+		
Disability (yes v. no)				
Ever held back (yes v. no)	+			
Number of risk factors (one or more v. none)			+	
Advanced 8th-grade course taking (yes v. no)			-	
8th-grade achievement (low or average v. high)	+	NA	+	
Mother's education (HS/less v. more than HS)				
School location (North-Central/South v. other)	+	+		+
School urbanicity (rural v. other)	+	+		+
Type of school (public v. other)	+			
School enrollment (small v. large)				
School reduced-price lunch participation (high v. low)			NA	
Behaviors (select list from those examined)				
Problem student behaviors:				
Misbehave (yes v. no)				
School problems (yes v. no)				
Fight (yes v. no)				
Cut/skip class (yes v. no)				
Tardy (yes v. no)		-		
Good student behaviors:				
Homework done per week (a lot v. little)				
Discuss program with counselor (yes v. no)				+
Discuss courses with counselor (yes v. no)				
Parental involvement:				
Attend school meetings (yes v. no)	-			
Speak to teacher/counselor (yes v. no)			+	
Check student's homework (yes v. no)				-
Expectations				
Student's college plans (HS/less v. more than HS)	+	+	+	NA
Locus of control (low or average v. high)				
Parent's college plans for student (HS/less v. more than HS)				
School has high academic standards (yes v. no)				

SOURCE: Agodini, Uhl, and Novak forthcoming. Analysis of NELS 88 data.

+ Indicates a positive and statistically significant influence on vocational education participation, all other characteristics in the table equal.
- Indicates a negative and statistically significant influence on vocational education participation, all other characteristics in the table equal.
NA indicates not applicable because the subgroup only includes students with this characteristic. HS = high school

NOTE: In reading the table, for example, the "+" in the row labeled "sex" and the column labeled "Overall 1992 High School Graduates" indicates that males were more likely than females to become an occupational concentrator, all other characteristics in the table held equal. The presence of a "+" or "-" indicates that a relationship is statistically significant.

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or ethnic groups are *not* more likely to participate in vocational education, once adjustments have been made for other characteristics such as SES and prior academic achievement. In fact, Hispanic students are *less* likely to participate, holding all else equal.

However, these results are based on data for 1992 seniors, the last time comprehensive national data on high school students was collected. Whether these factors play the same role in how *current* students become occupational concentrators (or investors or explorers) is less clear. New programs and initiatives implemented during the last decade—many intended to change the mix of high school students interested in career preparation—could affect the stability of these findings. It is therefore important to examine whether the characteristics of contemporary students are similar to those of graduates in 1992.

For the most part, there has been little change in who participates in vocational education during the last decade.

The data suggest that vocational education serves a diverse group of students, with most coming from the middle range of academic and income advantage. Some groups of students are more likely to participate substantially, although most characteristics of the vocational student population were relatively stable throughout the 1990s (Table 3.8).

- ***Vocational education continues to serve a somewhat disproportionate share of students with disabilities.*** In 1998, students with disabilities represented 2.8 percent of all high school graduates but 4.2 percent of all occupational concentrators. As in previous years, these students were much more likely to become concentrators (37.5 percent) and earned substantially more credits in vocational education (5.9) than did students without disabilities (24.6 percent and 3.9 credits). In fact, students with disabilities take a much higher share of their total credits in vocational education (23.5 percent) than do other students (15.7 percent).

  However, there is little recent support for a prediction of a report produced under the previous NAVE (Boesel et al. 1994a)—that students with special needs are becoming *more* concentrated in vocational education. Data between 1982 and 1990 show a modest trend in that direction, but it is not sustained during the 1990s. In addition, with special needs students accounting for less than five percent of all concentrators nationally, the notion of vocational education in general as a "dumping" ground for these students is not warranted. On the other hand, students with disabilities are overrepresented in some of the more traditional vocational program areas—agriculture, construction, mechanics and repair, and materials production.

Table 3.8

Participation Measures, by Characteristics of the Students: 1990 and 1998

	Average Number of Vocational Credits Earned			Percent of Students Who Are Occupational Concentrators		
	1990	1998	Change	1990	1998	Change
All Students	4.2	4.0	-0.2	27.8	25.0	-2.8*
Gender						
Male	4.3	4.3	+0.0	32.3	30.7	-1.6
Female	4.1	3.8	-0.3*	23.6	19.9	-3.6*
Race or Ethnicity						
Native or American Indian	4.6	4.0	-0.6*	38.0	25.5	-12.5*
Asian or Pacific Islander	3.1	3.2	+0.1	16.6	16.8	+0.2
African American, Black	4.4	4.3	-0.1	27.3	27.2	-0.1
Hispanic	4.1	4.0	-0.1	27.9	22.9	-5.0
White	4.2	4.0	-0.2	28.5	25.3	-3.2*
Disability Status						
Has disability	6.0	5.9	+0.1	42.2	37.5	-4.7
None indicated	4.1	3.9	+0.2	27.4	24.6	-2.8*
English Proficiency						
Limited (LEP)	2.9	3.2	+0.3	12.4	8.7	-3.7
Proficient	4.2	4.0	-0.2	27.8	25.1	-2.7*
Grade 9 Mathematics						
Geometry or Higher	2.7	3.0	+0.3	12.0	17.5	+5.5*
Pre-algebra or Algebra 1	3.9	4.1	+0.2	25.3	26.2	+0.9
No or low math	5.3	4.8	-0.5**	39.3	29.6	-9.7**
School Locale[1]						
Urban	3.7	3.6	-0.1	21.4	23.1	-1.7
Suburban	3.6	3.6	0.0	21.9	21.5	-0.4
Rural	4.8	4.8	0.0	31.3	31.0	-0.3
School Income Level						
Low	n/a	4.7	n/a	n/a	29.2	n/a
Medium	n/a	4.1	n/a	n/a	26.8	n/a
High	n/a	3.2	n/a	n/a	15.7	n/a

SOURCE: Levesque 2001. Analysis of National High School Transcripts.

[1]A comparable school locale variable was not available in 1990, so 1992 data were used instead.
n/a = not available *Significant at the 1.96 critical level for comparison between 1990 and 1998
LEP = Limited English proficient

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- ***Participation in vocational education is highest in low-income schools.*** Despite reform efforts during the 1990s that targeted low-income schools for academic improvement, students in these schools were taking more vocational education than were students in the most advantaged schools. In 1998, students in schools with more than 50.0 percent of students eligible for the federal free- or reduced-price lunch program earned 4.7 vocational credits, while students in schools with 5.0 percent or less eligible for the federal lunch program earned only 3.2 credits. Students in "moderate income" schools earned 4.1 vocational credits, an amount that is statistically similar to those in the lowest-income schools. The proportion of students who concentrate in an occupational program also follows this pattern based on school poverty levels. Changes between 1994 and 1998—the only years for which comparable data on school poverty are available—are not statistically significant.

  Importantly, while students in low-income schools are involved in vocational education at high rates, their participation does not appear to be concentrated in the traditional, blue-collar vocational program areas or in those that prepare students for generally low-wage jobs. That is, economically disadvantaged students are no more likely than more advantaged students to concentrate in construction, materials, production, mechanics and repair, personal services, or food and hospitality. Moreover, disadvantaged students are *as likely*, if not slightly more likely, to concentrate in the growing fields of health care and computer technology.

- ***Some progress has been made, although substantial disparities remain, in participation by gender.*** On average, high school preparation for occupations and careers has become neither more nor less gender balanced, despite the goals of Perkins gender equity provisions. Females still dominate enrollments in programs that prepare students for occupations such as health care, child care and education, and personal services (e.g., cosmetology). Males continue to dominate participation in agriculture and the traditional trade and industry programs (e.g., construction, mechanics and repair, print and materials production), fields that generally command higher wages than those for which female high school students are preparing. However, there are two notable program areas in which participation rates for males and females have moved closer together.

  - ***Computer Technology:*** The gender difference in credits earned in computer technology has grown smaller. By 1998 girls earned .30 credits while boys earned .32 credits, a statistically insignificant gap of 6.7 percent, down from 17.9 percent in 1990. This narrowing of the gap was accomplished largely by an increase in girls' participation in this vocational field while boys' participation remained relatively steady.

- ***Business Services:*** The reverse trend has occurred in business services; girls have been increasingly less likely, while boys are now more likely, to concentrate in this program field. One hypothesis is that interest in secretarial training has declined at the same time that computer-related business courses (e.g., spreadsheets, business data processing), which might have more appeal to boys, have become increasingly available.

Overall girls' vocational course taking has declined since 1990, at the same time that their academic course taking has risen substantially. In 1998 girls earned a lower share of their total credits in vocational education (14.9 percent) than did boys (17.1 percent).

- ***Students in rural schools are more likely to be involved in vocational education than are students in other locales.*** As historically has been the case, much of vocational education happens in small, generally rural communities. Although nationally, rural schools serve 32.3 percent of all public high school graduates, these same schools serve about 40.1 percent of all occupational concentrators. Urban and suburban schools account for 26.2 and 33.8 percent of concentrators (compared to 28.4 percent and 39.3 percent of all graduates). Although there have been modest declines in participation across all types of locales, students in rural schools earn more vocational credits (4.8 in 1998) than do students in urban and suburban schools (both groups earned 3.6 credits on average in 1998).

- ***African American students participate in vocational education somewhat more, and Asian students somewhat less, than students in other racial or ethnic groups.*** There is little evidence of any statistically significant change in vocational education participation by race or ethnicity during the last decade. However, African American students do earn more credits in vocational education (4.3) and Asian students earn fewer credits (3.2) than do other racial/ethnic groups (4.0 for Hispanic, white, and Native American students). Among all students in 1998, African Americans earned a higher share of their total credits in vocational education (17.4 percent) than did Asians (12.6 percent), and Asian students earned a lower share than did students from all other groups.

- ***Students with limited English proficiency (LEP) are much less likely to participate in an occupational program.*** The participation of LEP students in vocational education has fluctuated since 1990 (when data on this group first became available), perhaps because of the small sample of these students who

can be identified in the data. However, LEP students earn significantly fewer credits in vocational education (3.2 in 1998) and are much less likely to be occupational concentrators (8.7 percent) than are students who are English-language proficient (4.0 credits and 25.1 percent concentrators).

Whether these participation patterns are viewed as reassuring or with concern depends on whether vocational education improves student outcomes in general and specifically for those who participate at high rates. Analysis of the effects of vocational education on subgroups of students is under way and will be discussed in the final NAVE report.

Vocational education may be attracting somewhat more academically talented students.

During the past two decades, students overall have entered high school more prepared to take higher level math. In large part, this trend is due to the higher proportion of students now taking algebra in middle school—one consequence of many states' efforts to raise academic standards.

Students who become occupational concentrators are no exception to this trend. For example, more occupational concentrators entered high school taking high-level mathematics (geometry or higher) in grade 9 in 1998 than in 1990, an increase similar to that of non-concentrators (Table 3.8). Perhaps more importantly, the increase in middle-level 9th-grade math course taking (pre-algebra and algebra 1) was greater for occupational concentrators than for other students. Conversely, the proportion of occupational concentrators taking low-level mathematics in ninth grade declined more between 1990 and 1998 than did the proportion of other students taking low-level math. This suggests that, over time, vocational education may be serving relatively more academically advantaged students. Certainly, recent data from a NAVE collaboration with Texas and Florida suggests that the eighth-grade test scores of 1998 concentrators were relatively evenly distributed across quartiles of achievement—indicating that vocational education in those two states is drawing an academically diverse group of students (Hoachlander et al. forthcoming). These patterns are consistent with efforts during the 1990s to broaden the appeal of vocational education, as described in Chapter 2.

Implications

Vocational education remains an integral part of the high school experience. Nearly all students participate to some degree, and more than 40 percent do so substantially. While a comprehensive assessment of vocational education requires additional types of analyses (forthcoming in the final report), some implications can be drawn from the participation data. These data may help to address three policy concerns.

Is secondary vocational participation likely to decline as school reforms progress?

Vocational participation must be viewed against the backdrop of academic reform and changing school priorities. During the last decade of school improvement efforts, students have faced pressures to increase their academic course taking but have maintained their vocational participation largely by increasing the total number of credits they earn (e.g., eliminating study hall periods). If academic graduation requirements were to rise further, a reduction in vocational education course taking seems likely. These new requirements are most likely to affect students with disabilities and those in low-income schools, groups that take particularly high numbers of vocational courses relative to academic courses.

Far more important for vocational education is what will happen once state academic assessment programs are fully in place.[11] While vocational education may be attracting more academically able students, the overall population of students who pursue a vocational program of study come to high school with lower levels of academic achievement. These same students are likely to face the stiffest challenges in passing rigorous state exams. Some schools, like Patterson High School in Baltimore, will choose to double up on math and language arts courses in ninth grade to help students achieve necessary proficiency levels (McPartland and Jordan 2001). Other schools will require extra academic course work and remediation for those who fail the initial round of testing. In either case, participation in vocational education and other electives may decline as students concentrate their efforts and course taking on passing the exams.

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[11] Although many states are now implementing high-stakes testing, most are still gradually phasing in the penalties for students who are unable to pass. For example, the Massachusetts Comprehensive Assessment System (MCAS) has been in place since 1998, but students who were 10th-graders in fall 2001 were the first for whom the testing could have serious consequences.

There is an alternative possibility. Several high school strategies that have gained popularity in recent years may generate *more* vocational course taking, particularly among students who might not be as challenged by state assessments. New programs such as career academies have proliferated since the mid-1990s and are increasingly available and targeted to high academic achievers. High Schools That Work, another reform effort, promotes the notion that all high school students should major in some field, pursuing some subject in depth whether it is academic or vocational. As large high schools seek to implement smaller learning communities, the use of careers as an organizing theme for course planning has expanded and may draw in some students who might not ordinarily have taken vocational courses. Block scheduling is allowing more students to earn more credits, providing room for students to expand vocational participation or maintain current levels even in the face of increased academic course taking. Additional NAVE studies will bring more information to bear on the relationship between high school reform and vocational education.

Is there evidence that the academic performance of vocational students has been—or can be—improved?

The answer to this question is almost certainly yes. During the last two decades of school improvement efforts, students who become occupational concentrators, investors, and explorers have taken increasingly more and more rigorous academic courses, although a gap remains between them and other students who take few vocational courses. These trends demonstrate that it is indeed possible to impose higher academic course requirements on this group of students. Whether academic *achievement* has improved over time as a result of the more advanced course taking cannot yet be measured, but trends in NAEP 12th-grade test scores will be analyzed for the NAVE final report.

The larger issue is whether further advances in academic performance have to come at the expense of vocational course taking. Based on current data, some tools for improvement—academic standards and assessments—appear likely to have an adverse effect on vocational participation although, in the end, the students who do participate are more likely to be academically prepared for both college and employment. Given the poor performance of American high school students on international tests of math and science, and the fact that students earn more credits in vocational education than they do in either of those subjects, some educators would argue that a trade-off in courses might be beneficial to student outcomes. Such an analysis is being conducted for NAVE and will be discussed in the later report.

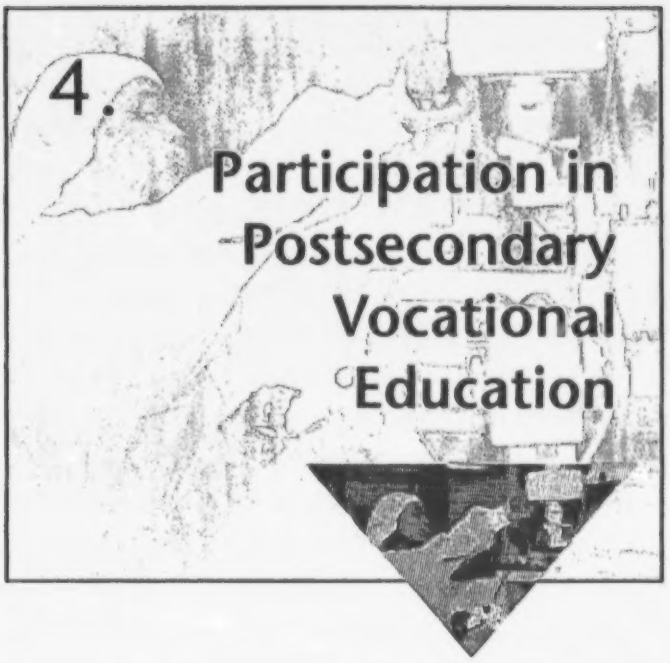
Other strategies, such as emphasizing academic skills in vocational course work, have been promoted in both Perkins II and Perkins III, although with some ambiguity. The leg-

islative call for "integration of academic and vocational education" does not explicitly place responsibility on vocational educators for academic content. And so far, there is little evidence of its prevalence or effectiveness. Additional information on how states and local communities are working to improve the academic performance of vocational students also will be presented in the final report.

What do vocational course taking patterns indicate about the purpose and objectives of vocational education and of federal policy?

Some trends suggest that vocational education in high schools is on a trajectory away from its traditional objective of providing well-trained technical workers. First, students are less likely to concentrate their occupational course taking. This pattern may indicate that students' participation is less about preparation for entry-level jobs, whether sought immediately after high school or after some postsecondary education. Some might argue that the less vocational education represents a defined program of related and advanced courses, the more similar it is to other electives—designed for personal exploration and enrichment rather than for society's economic benefit. On the other hand, many educators view less "concentrated" vocational course taking as consistent with labor market trends, which increasingly emphasize the need for workers to have broad-based skills and adaptability across jobs.

Second, the more vocational education attracts academically talented students, the less relevant are some aspects of federal policy. In particular, Perkins III and its precursors have emphasized preparation for occupations requiring less than a sub-baccalaureate degree. This stipulation largely runs contrary to recent state and local efforts to broaden career education and make it appealing to a wider set of students. This provision also does not take into account the reality of students' education aspirations, which increasingly emphasize baccalaureate degrees. Although students may not ultimately achieve that goal, in high school they believe it is possible.



4. Participation in Postsecondary Vocational Education

Vocational education is both a postsecondary and high school program, but the fundamental policy concerns for each are quite different. At the postsecondary level, few doubt the value or benefit of supporting vocational education. Rather, the issues are, first, whether postsecondary activities supported by the Carl D. Perkins Vocational and Technical Education Act (Perkins III) can or should be better integrated with those conducted under the Workforce Investment Act (WIA). The second is whether or not legislative language reflects federal priorities and is aligned with current postsecondary vocational education activity. Postsecondary vocational programs can help students to obtain a postsecondary degree or certificate, provide entry level skill training, skill upgrading, or retraining so that individuals can find jobs or get better jobs, and build capacity in particular strategic industries or occupations. Although not mutually exclusive, each of these objectives has different implications for the ways in which funds are used, key educational strategies are pursued by institutions, and criteria by which performance is best judged.

This chapter examines three questions about participation in postsecondary vocational education that can help address these policy concerns:

1. What is the extent and nature of postsecondary vocational education?
2. Who participates?
3. What are the goals of participants and to what extent are their patterns of participation consistent with their objectives?

key findings ▶

Key Findings

Participation in Postsecondary Vocational Education

- ***Participants in vocational programs are a significant proportion of all undergraduates.***

  One third of all students taking courses leading to a postsecondary credential—baccalaureate or sub-baccalaureate—are considered "vocational students." Postsecondary vocational students are defined as those who choose a vocational major and either attend a sub-baccalaureate institution or pursue an educational goal that does not include a baccalaureate degree or higher.

- ***Postsecondary vocational students, like the sub-baccalaureate population more generally, are often academically challenged and economically disadvantaged.***

  As is true for sub-baccalaureate students majoring in academic fields, a significant share of vocational students are from households with annual earnings of no more than $25,000 (about 30 percent of students still living with their parents and 57 percent of independent students). Among those who enter a sub-baccalaureate program soon after high school, a majority of vocational students (67 percent) score in the lowest two quartiles on a 12th-grade standardized academic test compared to 56 percent of those in academic programs.

- ***Students participate in postsecondary vocational education for different reasons, which only partially explains why many do not complete the course work needed to obtain a degree or certificate.***

  The majority of postsecondary vocational students completes eight months or less of postsecondary course work within a five-year time period. This amount of course taking may be consistent with acquiring job skills—the primary stated goal of just over 40 percent of sub-baccalaureate vocational students. However, it falls well short of attaining a less-than-baccalaureate's degree or the ability to transfer—the primary reason for course taking given by 46 percent of students majoring in vocational programs.

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Background

The nature of postsecondary vocational education has evolved in the past 30 years. Education is no longer, if it ever was, a one-time event preceding employment. Rather, lifelong learning and training are both increasingly important to the success of the modern labor force. The new model more likely involves a cycle of education and labor market experiences. In response, the nature of postsecondary offerings has significantly expanded and changed form, with students able to choose from a multitude of providers—including business, industry associations, and unions—for their education and training. Increasingly students also can decide whether they want their instruction in conventional classroom settings or online. This evolving environment, though, presents new challenges for federal policy.

Enrollment patterns tell only one part of the story about postsecondary vocational education, which receives about 40 percent of Perkins funds (Boesel et al. 1994b). Subsequent NAVE reports will examine how participating students benefit from their education. The combination of participation in, and the impacts of, postsecondary vocational education are intended to provide policymakers with a complete picture of postsecondary vocational education if, and whether, federal objectives in supporting vocational education are to be further specified at the postsecondary level.

Key Definitions and Participation Measures

The Perkins Act defines vocational education as a sequence of courses that provide academic and technical skills needed for careers requiring less than a baccalaureate degree (P.L. 105-332, Section 3(29)). Many types of institutions are eligible to receive Perkins grants, with community and technical colleges the most common postsecondary recipients.[1] Institutions that receive Perkins funding typically offer a range of vocational education and training activities—degree and certificate programs as well as job-related, noncredit courses and customized contract training.[2]

- ***Sub-baccalaureate:*** Refers to programs offered in less-than-four-year institutions or those that lead to less than a bachelor's degree (including no degree) at a four-year institution. Sub-baccalaureate students are those who participate in these programs

[1]The legislative definition of eligible postsecondary institutions can be found in P.L. 105-332, Section 3(10). Less common, although eligible, institutions include: four-year institutions that offer sub-baccalaureate vocational programs, adult centers, secondary districts and area vocational schools serving postsecondary students, education service agencies, and tribally or Bureau of Indian Affairs-controlled colleges.

[2]Customized contract training consists of courses and programs provided by a postsecondary institution to meet the specific training needs of an employer and its employees.

or indicate no degree goal or the goal of attaining less than a baccalaureate degree. Because of the stipulation in Perkins policy, this level of activity is the main focus of NAVE analysis.

- ***Vocational students:*** According to NCES classifications, postsecondary vocational students are defined as sub-baccalaureate students who major in the following areas: agricultural business and production, agricultural sciences, business, computer and information science, engineering, health professions, health-related professions, business management, communication technologies, personal services, engineering technologies, home economics, vocational home economics, science technologies, protective services, construction, automotive technology, precision production, and transportation (Choy and Horn 1992).

- ***Vocational associate degree programs:*** Generally comprised of both academic and vocational for-credit course work, totaling roughly 60 credits. Typically individual institutions decide whether vocational associate programs culminate in an associate of arts (AA), associate of science (AS) or associate of applied science (AAS) degree in fields defined as vocational. As a group, these programs can take two or more years to complete, depending on how many credits students earn each term. Despite the open-enrollment policies of most public sub-baccalaureate institutions, students still may need to apply and be accepted to a specific vocational program, particularly those in high demand (e.g., nursing).

- ***Institutional certificate programs:*** Typically designed to upgrade job-related skills, these programs require about one year's worth of full-time instruction in for-credit courses (24–30 credits) and, compared to associate degree programs, involve far less, if any, academic courses. However, certificates can be of varied duration and can be earned for quite diverse activities. Examples range from a floral arranging program lasting only a few weeks to a two-year certificate program in airframe and power plant mechanics (see Table 4.1 for additional examples). Like associate degree programs, these certificates are awarded by institutions based on credits accumulated. They are distinct from the increasingly popular industry skill certificates described below.

- ***Industry skill certifications:*** These industry-developed and recognized certificates designed to signal job skills are awarded to students based on their demonstrating well-defined skills (often through a test). Preparation for these tests includes self-study and courses offered at postsecondary institutions and other training providers. However, an industry association or employer group, not the training provider, grants the certificates.

Table 4.1
Illustrative Offerings of Vocational Associate and Certificate Programs, Florida Community Colleges: 1997–98

Associate in Science	Vocational Certificate
Accounting	Airframe and Power Mechanics
Architectural Design	Auto Collision Repair
Automotive Service Management	Automotive Machine Shop
Aviation Operations	Automotive Service Technician
Building Construction Technology	Barbering
Business Administration	Brick Masonry
Business Marketing Management	Carpentry
Civil Engineering Technology	Child Care Center Operator
Computer Engineering	Corrections Officer
Criminal Justice Technology	Cosmetology
Culinary Management	Credit Union Service Marketing
Dental Hygiene	Dental Assisting
Drafting and Design	Electricity
Early Childhood Management	Facials Specialty
Electronics Technology	Heating and Air Conditioning
Fire Science Technology	Massage Therapy
Graphic Design Technology	Medical Secretary
Interior Design	Nails Specialty
Legal Assisting	Network Support Services
Medical Laboratory Technician	Office Systems Specialist
Nursing, Registered Nurse (RN)	Paramedic
Radiography	Plumbing
Respiratory Care	Practical Nursing
	Teller Training
	Travel Agency Operations
	Webmaster and Web Development

SOURCE: Teitelbaum, Bradby, and Hoachlander forthcoming.

- ***Noncredit course work:*** Intended mostly to accommodate those seeking specific job-related skills, e.g., Introduction to Windows 98 (3 hrs), Introduction to Fiber Optics (20 hrs), Catering and Food Preparation (96 hrs), and Real Estate License Exam Preparation (20 hrs) or personal enrichment activities, e.g., ceramics or aerobics. Like courses within certificate programs, noncredit courses are diverse in their

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content and contact time. These can be stand-alone courses or sequenced courses in a nondegree-granting program (sometimes similar or even indistinguishable from for-credit courses offered in vocational degree or certificate programs).

Data Sources

This report draws on multiple, nationally representative surveys conducted by the National Center for Education Statistics (NCES): the National Postsecondary Student Aid Study (NPSAS 1996), National Household Education Surveys Program (NHES 1995, 1999), High School and Beyond Longitudinal Study (HS&B 1992 follow-up), Beginning Postsecondary Students Longitudinal Study (BPS 1994) and, to a limited extent, the National Education Longitudinal Study (NELS 1994 follow-up).[3] Although no single survey sufficiently covers the entirety of the diverse populations and the many providers, in combination, the surveys offer a fairly comprehensive description of postsecondary vocational education. As is true with the secondary vocational education analysis, current NCES postsecondary data are not able to capture changes in participation that might result from Perkins III provisions specifically. If more current data become available, a further assessment of postsecondary vocational participation will be included in the NAVE final report.

Postsecondary Vocational Education and Training Institutions and the Courses They Offer

Vocational education at the postsecondary level is a complex enterprise. There are many types of providers, programs, and credentials as well as single, noncredit courses that do not lead to degrees. Institutions eligible for Perkins grants often provide a full array of these offerings and are free to determine which of the many choices to support with Perkins funds. Whether all of these types of programs and courses are equally worthy of federal investment is a potentially important issue for policymakers. Understanding the full extent and nature of the different offerings therefore provides important context (Table 4.2).

- ***Community colleges are the main provider of for-credit vocational courses.*** Based on student counts in 1999, 40.4 percent of those participating in for-credit vocational courses—those that could lead to a postsecondary credential of some kind—do so at a community college. Fewer participate in for-credit course work at proprietary institutions (22.6 percent), postsecondary technical schools (13.5 percent), or at baccalaureate-granting institutions (5.2 percent).

[3]For additional information about these surveys, see: http://nces.ed.gov/surveys/.

Table 4.2
Percentage of Participants Taking For-credit and Noncredit, Job-Related Courses, by Provider

Provider	Credit	Noncredit
Area Vocational Centers	0.9	4.3
Two-year Community College	40.4	4.3
Public Two-year Vocational or Technical School	13.5	1.9
Four-year College or University	5.2	11.9
Proprietary School	22.6	9.1
Adult Learning Center	2.2	1.3
Business or Industry	5.2	36.7
Professional Association or Labor Union	2.0	10.4
Government Agency and Public Library	4.9	11.6
Community, Religious, or Other Organization	3.1	8.6
Total	100.0	100.0

SOURCE: Bailey et al. forthcoming. Analysis of National Household Education Surveys Program 1999.

- ***Most noncredit courses are taken at institutions that are not eligible for Perkins grants.*** By far, business and industry account for most of the noncredit, job-related classes, seminars, and training programs offered nationally (36.7 percent of participants). Government agencies and professional associations or labor unions each serve 10.4 percent of noncredit vocational participants. In contrast, a small share of job-related noncredit participants report taking their courses at "formal" postsecondary education institutions, such as a four-year college or university (11.9 percent), a community college (4.3 percent) or public two-year vocational or technical school (1.9 percent).

- ***Noncredit vocational course participation is substantial, but for-credit courses still dominate in formal postsecondary institutions.***[4] Of those who pursue job-

[4]State financing policies, which vary from state to state, may play a role in the extent of noncredit offerings at public postsecondary institutions. For example, in Arizona the state does not pay individual institutions for noncredit courses and, perhaps as a result, for-credit enrollments are proportionally higher than in other states. In contrast, Texas reimburses its postsecondary institutions for enrollments in noncredit courses, and participation in these courses is relatively high. The prevalence of job-related noncredit courses varies widely from institution to institution as well. In Florida "supplemental vocational courses"—noncredit courses for people seeking to enhance their job skills—are about 25 percent of a given institution's headcount. In contrast, a community college in Michigan reports that noncredit courses are less than 10 percent of their course offerings and less than half of those are job-related.

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related courses in and outside of the formal postsecondary education system over the course of a year, most (81.7 percent) take noncredit courses exclusively. Only 13.7 percent are exclusively in for-credit courses, with another 4.6 percent participating in both credit and noncredit courses simultaneously. Even so, most participants (64.1 percent) with a vocational emphasis at community colleges enroll in for-credit courses.

This distinction between credit and noncredit vocational participation is important to Perkins policy for several reasons. First, Perkins has a long history of promoting equal access to services by providing relatively more financial support to institutions serving large numbers of economically disadvantaged students. This approach is executed at the postsecondary level by requiring that, within states, Perkins grants are allocated to postsecondary institutions based on a formula weighted toward the number of Pell grant—federal financial aid—recipients the institutions serve.[5]

However, Pell grants are available only to income-eligible students who pursue *for-credit* (degree-oriented) course work; federal policy supports noncredit education and training through the Lifelong Learning Tax Credit and Individual Training Account vouchers available under WIA. Still, community colleges serve a significant number of noncredit vocational participants and some have questioned whether Perkins' funding allocation emphasis on for-credit course work is appropriate. In considering this question, policymakers may want to know whether participation in noncredit courses is consistent with Perkins compensatory goals and other objectives.

The second related concern about credit versus noncredit course work regards accountability. New Perkins III accountability provisions include "completion of a postsecondary degree or credential" as a key measure of performance (P.L. 105-332, Section 113(b)). Perkins III contains no language that prevents institutions from spending grant funds on shorter-term noncredit training but, if taken seriously, the accountability requirements provide further incentive to emphasize for-credit programs and credentials. This legislative signal may or may not be well aligned with current federal policy priorities. These issues will be explored in this chapter, and in more detail in the NAVE final report.

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[5]Under P.L. 105-332, Section 132(b), the law does permit the secretary to approve alternative formulas that more effectively target funds to eligible institutions that have the highest numbers of economically disadvantaged individuals.

The Extent of Postsecondary Vocational Education

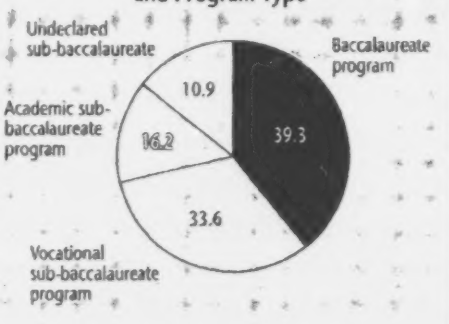
Although a majority of high school students aspire to a bachelor's degree (Sanderson et al. 1996), by some key measures, most postsecondary students actually enroll in sub-baccalaureate programs, including vocational ones.[6] The relative size of these groups is important, given that transitions to and completion of a college degree remains a key goal of federal education policy generally, particularly for disadvantaged students.

Participants in vocational programs are a significant share of all undergraduates.

In 1996, one-third of all for-credit postsecondary education students—nearly 5.5 million youths and adults—were enrolled in sub-baccalaureate vocational courses and programs (Figure 4.1). These vocational student enrollments (33.6 percent) nearly equal those in programs that lead to bachelor degrees (39.3 percent).

- ***All sub-baccalaureate students outnumber baccalaureate students.*** Among those pursuing for-credit course work, a substantially higher proportion of students are sub-baccalaureate (60.7 percent)—vocational, academic, and undeclared—than baccalaureate (39.3 percent). If noncredit participants were included in the sub-baccalaureate counts, of course the share of all postsecondary students that are enrolled in sub-baccalaureate education would be even greater.

Figure 4.1
Percentage of Students, by Degree Level and Program Type



SOURCE: Bailey et al. forthcoming. Analysis of National Postsecondary Student Aid Study,1996.

[6]National data on postsecondary enrollment are reported in different ways. Most commonly, the figures are based on fall enrollments provided by individual institutions of higher education (e.g., to NCES through the Integrated Postsecondary Education Data System (IPEDS)). However, limiting enrollment data to the fall greatly reduces the number of reported participants at the sub-baccalaureate level because many of these students enroll throughout the year. In addition, enrollment data in IPEDS are reported separately by institution type (four-year and two-year). Since 12.5 percent of sub-baccalaureate programs are offered at four-year institutions, aggregate IPEDS enrollment figures for just two-year institutions further underreport sub-baccalaureate program participation.

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- ***At the sub-baccalaureate level, more students choose a vocational than an academic major.*** Among sub-baccalaureate students, twice as many (55.3 percent) choose a vocational major as an academic major (26.7 percent). The remaining students are "undeclared" (18.0 percent).[7] There is some evidence of a shift during the 1990s from vocational majors to "undeclared," but whether this signals a real decline in interest in sub-baccalaureate vocational programs is unclear (Levesque et al. 2000, p. 161).

Both institutional certificates and industry-developed skill certifications are not as popular as associate degrees, but the industry credentials appear to be growing in popularity.

Postsecondary institutions supported by Perkins grants traditionally have offered both associate degree and institutional certificate programs, each resulting in a different credential based on institutional and, in some cases, state requirements. Both are credentials conferred by higher education institutions and are included in the data collection efforts of NCES.

Institutional certificates are distinct from skill certificates conferred by industry, trade, and professional associations (e.g., information technology (IT) certifications offered by Novell, Cisco, and Microsoft; Automotive Service Excellence (ASE) certifications offered by the National Institute for Automotive Service Excellence). Although formal postsecondary institutions may be increasingly offering courses to support these emerging industry-developed skill certificates, the institutions do not grant the certificates and therefore are not a systematic source of information on certification attainment. As a result, there are no national statistics that measure the number of industry certificates awarded. Still, available data from industry and associations do suggest some trends.

- ***Enrollment in vocational associate degree programs far exceeds that in institutional certificate programs.*** Among students declaring a vocational major, two-thirds aim to obtain associate degrees while only one-third pursues institutional certificates. In addition, there is some indication that the number and proportion of certificates conferred by Perkins-eligible postsecondary institutions may have declined slightly in recent years.[8]

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[7]The percentage of students by major—vocational, academic, or undeclared—reported here differ from those reported in Levesque et al. 2000 primarily due to sample differences. The calculations for this report exclude students who did not answer the NPSAS question about their major (i.e., missing values for this question). In contrast, the Levesque et al. 2000 report included these students as undeclared majors.

[8]Although NCES data indicate a small decline in institutional certificates earned, changes in data collection and reporting definitions over time make the accuracy of comparisons across years somewhat uncertain (Snyder et al. 1992–99).

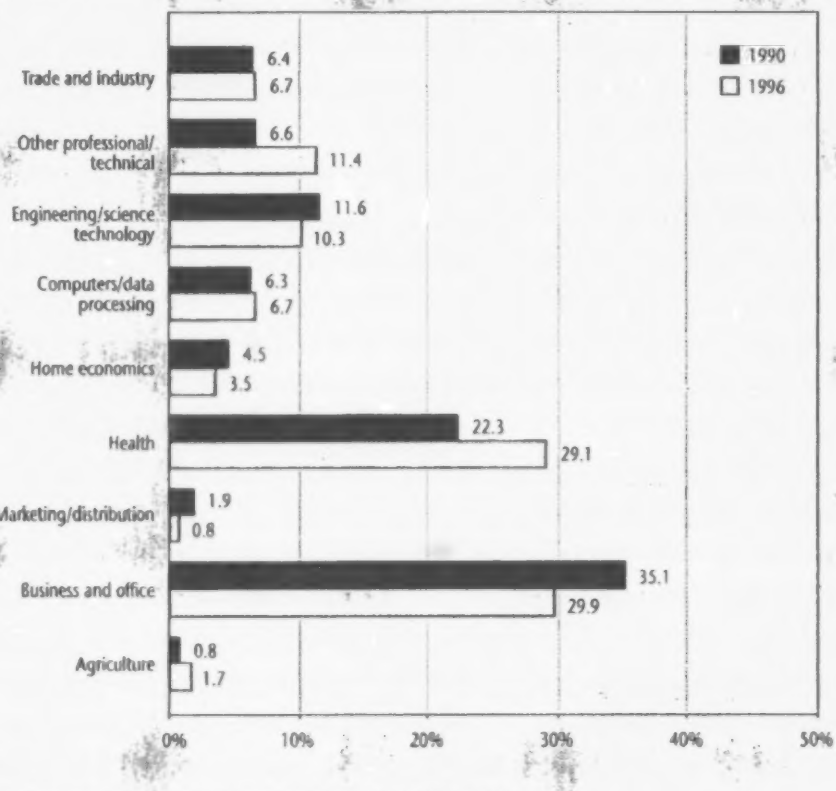
- ***The number of industry-developed certifications is growing, but the role of Perkins institutions in this growth is still unclear.*** Although NCES data do not provide information on certificates conferred by employers or by national industry, trade, and professional associations, the groups themselves report that the number of certifications both offered and granted is increasing. For example, there was nearly a tenfold increase in Microsoft Certified Systems Engineer (MCSE) certificates awarded between the years 1997 and 2000—from about 35,000 to more than 280,000. Much of this growth, however, may have no bearing on Perkins-eligible postsecondary institutions; at least in the prominent area of IT, courses supporting this growth are predominantly taken outside the formal postsecondary education system, offered instead by commercial training providers (Adelman 2000).

Enrollments in vocational associate degree programs appear responsive to labor market trends.

The primary purpose of postsecondary vocational education is to prepare individuals to enter and succeed in specific occupations in the labor market. The ability of postsecondary institutions to offer up-to-date programs that are responsive to fluctuations in employment supply and demand is crucial to maintaining program quality and enrollments. At the postsecondary level, it is often argued that these market forces should encourage participation in those programs that increase wages and employment the most. This outcome, however, presumes that consumers are sufficiently informed about job opportunities to make enrollment decisions based on them. Examining the relationship between national labor market trends and postsecondary occupational education patterns partially tests these assumptions and has implications for federal policy.

The data indicate that, between 1990 and 1996, enrollments in vocational associate degree programs grew substantially (27.0 percent), perhaps in response to strong employment growth during a comparable period in fields that require such training. Both health- and computer-related fields have experienced and are expected to continue to have substantial job growth. Possibly in anticipation of good employment opportunities, the proportion of sub-baccalaureate vocational students enrolled in health programs has increased. The share of students enrolled in computer associate degree programs has also increased, although by a small amount. Similarly, those fields that have experienced relatively slow or even declining job growth are also the fields in which the proportion of postsecondary vocational enrollments has fallen. For example, relative enrollments in the business field declined at the associate degree level (Figures 4.2a and 4.2b).

Figure 4.2a
Percentage of Students Enrolled in Vocational Associate Degree Programs, by Field of Study: 1990 and 1996



SOURCE: Erard forthcoming, Analysis of National Postsecondary Student Aid Study 1990 and 1996.

Some evidence suggests that the relationship between certificate program participation and job growth may be more mixed. Unfortunately, the categories used to classify major fields of study for the certificate program enrollment data are not sufficiently comparable between 1990 and 1996 to allow an analysis of certificate program enrollment and employment trends by field. However, certificate *completion* data have been consistent for this time period.[9] These data indicate that, among the occupations with the highest

[9]Unlike in associate degree programs, a majority of participants in certificate programs complete the program requirements and earn the credential. Thus, completion is a reasonably accurate proxy for enrollment.

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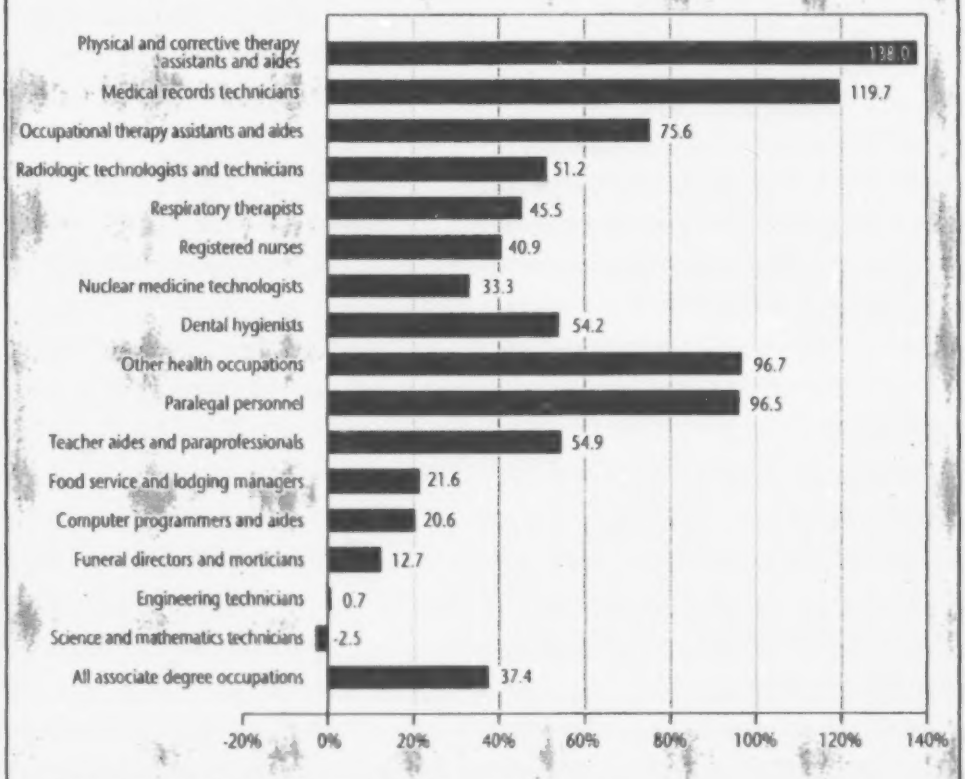
Figure 4.2b
Percentage Change in Number of Jobs, by Selected Occupational Fields Requiring a Vocational Associate Degree: 1986–1996



SOURCE: Erard forthcoming. Analysis of Bureau of Labor Statistics employment data.

historical and projected rates of employment growth (emergency medical technician, medical assistant, library technician, surgical technologists and technicians, and dental assistants), the proportion of students completing related certificate programs significantly increased between 1992 and 1997. However, there are several occupations (e.g., hairdressers, automotive body repair and other related occupations, automotive mechanics, bus and truck mechanics) in which actual and projected employment growth is below average, and yet certificate completion in these fields has increased (Table 4.3).

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Table 4.3
Percentage of Students Completing Vocational Certificate Programs, by Field of Study: 1991–92 and 1996–97

Detailed Field of Study	Percent	
	1991–92	1996–97
Fields with an increasing proportion of students completing:		
Dental Assistant	1.40	3.63
Emergency Medical Technician	1.98	5.04
Surgical Technician and Technologist	0.51	1.21
Medical Assistant	8.25	16.02
Practical Nurse	7.03	13.25
Medical Secretary	1.98	3.55
Electroneurodiagnostic Technician	0.01	0.03
Technical Assistant, Library	0.03	0.06
Human Service Worker, including Resid. County Welfare Interviewers	0.03	0.05
Tool and Die Maker	0.12	0.19
Welder and Cutter	2.23	3.11
Motorcycle Repairer	0.14	0.46
Automotive Mechanic	4.07	5.49
Automotive Body Repair and Other Related Occupations	1.08	1.32
Bus and Truck Mechanics and Diesel Engine	1.11	1.24
Drafter	2.41	2.88
Broadcast Technician	0.74	0.75
Other Telecommunications Mechanics, Installers, or Repairers	0.18	0.18
Hairdressers, Hairstylists, and Cosmetologists	18.77	19.26
Fields with a decreasing proportion of students completing:		
Survey and Mapping Technicians and Scientists	0.11	0.09
Mobile Heavy Equipment Mechanic	1.12	0.88
Secretary, except Legal and Medical	17.59	14.67
Legal Secretary	1.48	1.11
Stenographer and Court Reporter	0.55	0.31
Interior Designer	0.40	0.16
Aircraft Mechanic	1.63	1.07
Small Engine Specialist	0.77	0.30
Travel Agent	8.14	2.77
Photographer and Camera Operator	1.93	0.35
Dancer and Choreographer	0.08	0.01
Sales Agent, Real Estate	14.18	0.56
All Listed Fields	100.00	100.00

SOURCE: Erard forthcoming. Analysis of the Integrated Postsecondary Education Data System 1991, 1996.

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The Characteristics of Postsecondary Vocational Participants

If policymakers choose to reexamine the role of Perkins at the postsecondary level, it will be important to have an accurate picture of whom vocational programs serve. Sub-baccalaureate students are quite distinct from their peers in bachelor degree programs. They are far more disadvantaged, both academically and economically, and are more likely to pursue their postsecondary education at any time (not just immediately following high school), with less intensity and continuity. In contrast, there are fewer differences between sub-baccalaureate students who choose vocational rather than academic programs.

Students in postsecondary vocational education tend to be academically challenged.

Sub-baccalaureate students, overall, often enter college lacking the necessary academic skills to succeed (Coley 2000). As noted in Chapter 2, nearly two-thirds of students enrolled in community colleges take some remedial courses. The educational needs signaled by these statistics are particularly important for federal policy, because academic ability and prior academic preparation are among the strongest predictors of postsecondary persistence and completion (Horn and Kojaku 2001). Vocational students, at least those in for-credit courses and programs, may face some particular challenges.

- ***Postsecondary vocational students tend to enter with low levels of academic achievement.***[10] Examination of 12th-grade achievement test scores for younger sub-baccalaureate students indicates that a higher proportion of vocational than academic students (66.5 percent compared to 56.2 percent) are in the lowest two test quartiles (Table 4.4).

- ***Postsecondary vocational students are somewhat less likely to have pursued a rigorous high school program.*** Like their academic peers, vocational students in sub-baccalaureate programs are typically not as well prepared for college as are those who pursue baccalaureate programs. Although substantial proportions of younger sub-baccalaureate academic (84.7 percent) and vocational (79.0 percent) majors met the "New Basics"[11] standard for high school course taking, both are less than the percentage of younger baccalaureate students (94.5 percent) who met those same requirements. Postsecondary vocational students are also more likely than their academic peers to have pursued a vocational program in high school (Table 4.4).

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[10]Detailed high school preparation and academic test scores are available only for younger students who transitioned right after high school and therefore do not represent the full population of postsecondary vocational students.

[11]The New Basics is defined as a high school program of study that includes math, English, science, and social studies courses totaling at least 12 high school credits.

Table 4.4
Percentage Distribution of Baccalaureate and Sub-baccalaureate Students, by High School Test Scores and High School Program

Program	Standardized Reading and Math Test Quartiles		High School Program[1]			
	Lowest Two Quartiles	Highest Two Quartiles	At Least New Basics[2]	Both Vocational/ New Basics	Vocational	General
Baccalaureate	22.4	77.6	90.8	3.7	0.7	4.8
Sub-baccalaureate	61.2	38.9	71.1	10.0	5.1	13.9
Vocational	66.5	33.5	67.5	11.5	7.0	14.1
Academic	56.2	43.8	76.1	8.6	2.7	12.6

SOURCE: Bailey et al. forthcoming. Analysis of National Education Longitudinal Study 1992.

[1]Based on high school transcripts

[2]New Basics=Math, English, Science, Social Studies totaling at least 12 high school credits

- ***Postsecondary vocational students report less remedial course taking than do academic students, probably because vocational programs have fewer academic requirements.*** Among all students beginning postsecondary study (younger and older) vocational students are less likely than academic students to take remedial courses, particularly in math (Table 4.5).[12] However, this measure does not necessarily reflect a difference in the *need* for improvement in basic skills. Rather, a significant proportion of sub-baccalaureate students who choose vocational majors pursue programs that have few academic requirements (e.g., certificate programs), and therefore the students are less likely to be required to take any remedial courses.

- ***Few students who pursue a sub-baccalaureate vocational major already have a postsecondary credential.*** Although some measures suggest that vocational students are less academically prepared than those in academic majors, there seems to be little difference in terms of the credentials they bring to their sub-baccalaureate education. There is no evidence for either group that large numbers of students with prior postsecondary degrees are returning for additional education in the degreed pro-

[12]Because recent national surveys do not contain postsecondary transcript information, these are self-reports of remedial course taking and are likely to be underreported. However, the bias is likely to be similar for both academic and vocational students; hence the difference by major is still informative. Additionally, information from Florida community college participants based on institutional student records demonstrates the same finding that students in vocational programs are less likely to take a remedial course than their academic peers. Students who are enrolled in certificate programs are the least likely to take a remedial course.

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Table 4.5
Percentage of Sub-baccalaureate Students Who Report Taking[1] Remedial Courses, by Major

	Some Remediation	Specific Remediation		
		Math	Writing	Basic Skills
Vocational	11.1	8.0	4.9	2.8
Academic	15.4	11.2	5.3	3.1

SOURCE: Bailey et al. forthcoming. Analysis of National Postsecondary Student Aid Study 1996.
[1]Self-reports of course taking

grams, as some have suggested. In fact, the vast majority of students in for-credit sub-baccalaureate programs (80.5 percent) have no prior postsecondary degree. And among those who do have a postsecondary credential, most have attained only an institutional certificate. In contrast, recent analyses conducted by the American Association of Community Colleges (AACC) and ACT, Inc. suggest that over a quarter of *noncredit* enrollees at community colleges had already attained a bachelor's degree or higher (Phillippe and Valiga 2000).

Vocational education serves somewhat more disadvantaged students.

For nearly four decades, federal vocational policy has encouraged the participation of students from specific groups that Congress believed to be underserved or facing particular barriers to involvement in postsecondary education and ultimately in the labor market. Whether due to these legislative provisions or simply individuals' personal preferences and circumstances, it is certainly the case that in the 1990s many of the "special populations" were well represented in sub-baccalaureate vocational as well as academic programs.

As described in Chapter 3, these designated "special populations" include individuals with disabilities, individuals from economically disadvantaged families, individuals preparing for nontraditional training and employment, single parents, displaced homemakers, and individuals with other barriers to education achievement, including limited-English proficiency. Nationally representative data on the postsecondary participation of each of these groups are limited and available only for those students taking for-credit courses.

- ***Students with disabilities are about equally likely to be enrolled in a vocational or an academic major.*** Students with disabilities make up a small share of either baccalaureate or sub-baccalaureate students—both are less than two percent. These

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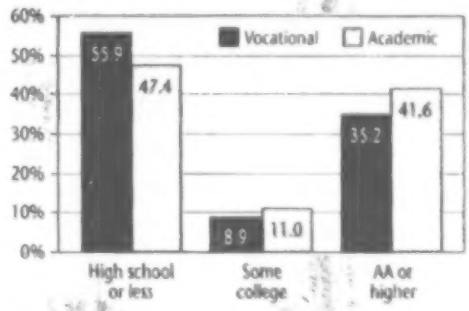
students participate in vocational education and in academic sub-baccalaureate programs at similar rates.

- ***In terms of economic disadvantage, vocational students may face greater challenges.*** Sub-baccalaureate students in households earning less than or equal to $25,000 a year are about equally likely to select a vocational as compared to an academic major.[13] However, a significantly higher share of vocational students (55.9 percent) than academic students (47.4 percent) are the first in their families to attend college, an indicator highly associated with limited economic resources and significant barriers to postsecondary enrollment and success (Warburton, Bugarin, and Nuñez 2001; Figure 4.3).

Figure 4.3
Distribution of Sub-baccalaureate Students, by Major and Parents' Highest Education Level



SOURCE: Bailey et al. forthcoming. Analysis of National Postsecondary Student Aid Study 1996.

- ***Single parents are more likely to pursue vocational than academic programs.*** A higher share of sub-baccalaureate vocational students (16.1 percent) than academic students (11.4 percent) are single parents, a group that, until Perkins III in 1998, were the focus of targeted programs with set-aside funding.

- ***Enrollments in vocational programs preparing students for high-wage occupations follow gender-traditional patterns, but neither males nor females are clearly advantaged.***[14] Female enrollment dominates in fields such as nursing and social work. Male enrollment dominates in engineering, mechanics, and electronics. However, among other majors that prepare students for high-wage occupations (such as finance, mortuary science, and design), enrollment is fairly balanced by gender. Computer programming and computer and information sciences also have balanced male-female enrollments (Table 4.6).

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[13]Among students in these low-income households, similar proportions of those living with their parents pursue vocational (29.5 percent) and academic (28.9 percent) programs, and similar proportions of independent students choose vocational (56.7 percent) and academic (54.1 percent) majors.

[14]In 1998, the mean annual wage among sub-baccalaureate occupations was $30,775. Promoting gender equity in vocational education is of greatest interest in the high-wage occupations; therefore the high-wage occupations are defined as those with a mean annual wage greater than $35,000.

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Table 4.6
Percentage of Male and Female Students Enrolled in Fields Preparing Them for High-Wage[1] Occupations: 1996

Major Field of Study	Gender	
	Male	Female
Precision Production (e.g., lithography, upholstery, metal work, drafting, welding)	96.3	3.7
Mechanics: Transportation	96.1	3.8
Electronics	93.1	6.9
Engineering Technology	83.8	16.2
Communications Technology	81.6	18.4
Computer and Information Sciences (hardware and software other than programming)	51.7	48.4
Computer Programming	51.4	48.6
Allied Health: General and Other	50.1	49.9
Business: Finance	49.2	50.9
Design (e.g., graphic, illustration, industrial, interior, product design)	47.3	52.7
Mortuary Science	41.2	58.8
Data Processing Technology	30.4	69.6
Social Work	28.0	72.0
Allied Health: Therapy and Mental Health	27.9	72.1
Allied Health: Dental and Medical Technician	19.6	80.4
Nursing: Registered Nurse	9.7	90.3
Nursing: Nurse Assisting	4.3	96.7

SOURCE: Bailey et al. forthcoming. Analysis of National Postsecondary Student Aid Study 1996; Erard forthcoming. Analysis of Bureau of Labor Statistics employment data.

[1]High-wage occupations are defined as those with average annual wages in 1998 that were greater than $35,000.

- ***Vocational students, like all sub-baccalaureate students, are racially and ethnically diverse.*** A higher proportion of African Americans choose to enroll in sub-baccalaureate vocational programs (16.1 percent) compared to academic programs (10.7 percent). Hispanic students, however, are more likely to pursue academic (16.8 percent) than vocational programs (11.1 percent). Asian Americans and Native Americans are just as likely to enroll in an academic as in a vocational sub-baccalaureate program (Figure 4.4).

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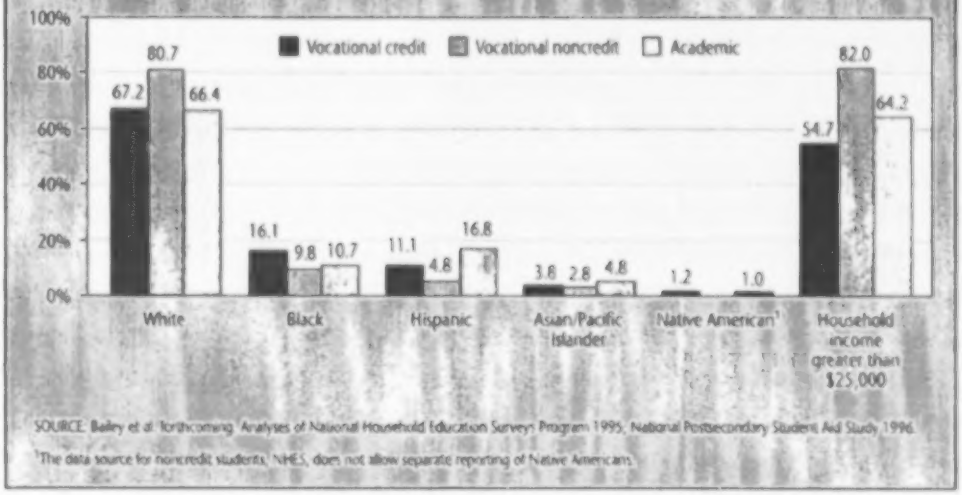
Figure 4.4
Characteristics of Sub-baccalaureate Students in Credit and Noncredit Courses



SOURCE: Bailey et al. forthcoming. Analyses of National Household Education Survey Program 1995, National Postsecondary Student Aid Study 1996.

[1]The data source for noncredit students, NHES, does not allow separate reporting of Native Americans.

Credit and noncredit courses at postsecondary institutions serve different populations.

Students who participate in sub-baccalaureate vocational education are a diverse group, with many facing economic and educational challenges. Within the group, however, there are some differences in characteristics by the types of courses students take—for-credit versus noncredit. In general, job-related noncredit courses serve more advantaged populations.

- ***Participants in noncredit vocational courses have higher incomes.*** The vast majority of noncredit participants in job-related courses (82.0 percent) have a household income greater than $25,000. In comparison, only 54.7 percent of students enrolled in for-credit vocational courses have household incomes greater than $25,000 (Figure 4.4).

- ***Noncredit courses are primarily taken by those already employed.*** Perhaps helping to account for the income differences, virtually all participants in noncredit courses (90.1 percent) work while they are enrolled in job-related noncredit courses.[15] Most

[15]Among the noncredit students who were unemployed and seeking work, nearly one-third reported public assistance as a source of funds for their education (Phillippe and Valiga 2000). National statistics show that only 2.1 percent of community college students participating in noncredit work in 1999 were unemployed.

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of them (88.4 percent) report "improving in their current job" or "training for a new job" as their primary reason for taking the noncredit courses. In contrast, 84.9 percent of students in for-credit courses work while participating in postsecondary vocational courses. Of those who work, just over half (52.5 percent) view themselves primarily as a student working to meet expenses.

- ***Students of color are less likely to pursue noncredit course work.*** Many of the noncredit vocational participants are white (80.7 percent), while only 67.2 percent of vocational students in for-credit courses are white (Figure 4.4).

The Varied Goals and Pathways of Participants through Postsecondary Vocational Education

Many, perhaps including policymakers, view "college participation" in a traditional way. They think of 18-year-olds attending college in the fall immediately following high school graduation and continuing to attend full-time until they obtain baccalaureate degrees approximately four years later. However, this description of participation does not describe the vast majority of sub-baccalaureate students or of vocational students in particular. Vocational students often do not participate full-time or continuously and often have goals other than completing a degree.

Postsecondary vocational programs serve many objectives, but whether or not Perkins III can or is intended to address all of them is a question policymakers may wish to consider. If so, then what constitutes completion is a key issue. Current legislated accountability provisions emphasize completion of a postsecondary degree or certificate or transfer to another institution for further education. However, the diversity of participants and their objectives makes assessing achievement of these objectives complicated. On the other hand, current accountability provisions may be appropriate given the long-standing federal goal of promoting degree completion.

Postsecondary vocational students have primarily "nontraditional" attendance patterns.

Students participating in sub-baccalaureate programs—both academic and vocational—do not typically follow the attendance patterns often associated with "college" enrollment (Table 4.7). "Nontraditional attendance"—part-time, at multiple institutions, with interruption—is common and has increased over time. About three-quarters of sub-baccalaureate students (69.8 percent of the vocational and 83.0 percent of the academic students) attend postsecondary education in nontraditional ways. Among students less

Table 4.7
Percentage Distribution of Sub-baccalaureate Students' Age and Attendance Patterns, by Major

	Vocational	Academic
Worked while Enrolled	84.9	88.6
Age		
Under 20	18.6	21.2
20–23	23.7	30.3
24–29	22.5	18.1
30 and older	35.2	30.4
Full-time, full-year participation	24.8	25.7
Delayed entry[1]	50.9	42.0
Nontraditional attendance[2]		
1989 (all ages)	69.8	83.0
(24 and older)	70.4	83.0
(18- to 23-year-olds)	69.5	83.0
1982 (18- to 23-year-olds)	46.1	53.5

SOURCE: Bailey et al. forthcoming. Analysis of NPSAS 1996, BPS 1989–94, and HS&B 1982.

[1]Delayed enrollment follows the National Postsecondary Student Aid Study definition, which includes any student who either enrolls in postsecondary education a year or more after high school graduation or is a General Educational Development (GED) recipient prior to enrollment.

[2]Participating in postsecondary education less than full-time or less than a full year, with interruption, or at multiple institutions are all patterns of nontraditional attendance. Any combination of these participation patterns defines attendance as nontraditional. In order to identify these patterns during a five-year period, both the High School and Beyond Study (limited to the first five years immediately following enrollment in postsecondary sub-baccalaureate programs) and the Beginning Postsecondary Students Longitudinal Study (also five years) were used.

than 24 years old, the proportion pursuing vocational programs either part-time, at multiple institutions, or discontinuously increased from 46.1 percent in 1982 to 69.5 percent in 1989. Several factors contribute to the prevalence of nontraditional attendance patterns.

- ***Most postsecondary vocational students work.*** A large proportion of sub-baccalaureate students (almost 90 percent of either vocational or academic majors) are employed while in postsecondary education. Some work to defray expenses associated with pursuing postsecondary education. Some are primarily workers who are pursuing additional education, perhaps to improve their skills for a better job.

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- ***Postsecondary vocational students tend to be older than their academic peers.*** Most (57.7 percent) of those students declaring a vocational major are 24 years old or older. Students 30 years of age and older make up 35.2 percent of all vocational students. In comparison, just less than half (48.5 percent) of the sub-baccalaureate students enrolled in an academic program are 24 years old or older and only 30.4 percent are aged 30 years and older.

- ***Delayed entry and part-time attendance in postsecondary sub-baccalaureate education are common.*** Half of vocational program participants (50.9 percent) begin postsecondary education more than a year after graduation from high school. This delayed entry is somewhat more likely among vocational than academic sub-baccalaureate students. Only one-quarter of either vocational or academic students in sub-baccalaureate programs attend full-time, full-year.

On the one hand, the ability for students to attend postsecondary institutions part-time, as they can, and to attend the most convenient campus are all hallmarks of sub-baccalaureate institutions. On the other hand, these attendance patterns raise concerns about the labor market prospects for sub-baccalaureate students, including those in vocational programs, because research indicates a relationship between nontraditional enrollment patterns and lower earnings (Scott and Bernhardt 1999; Light 1995).

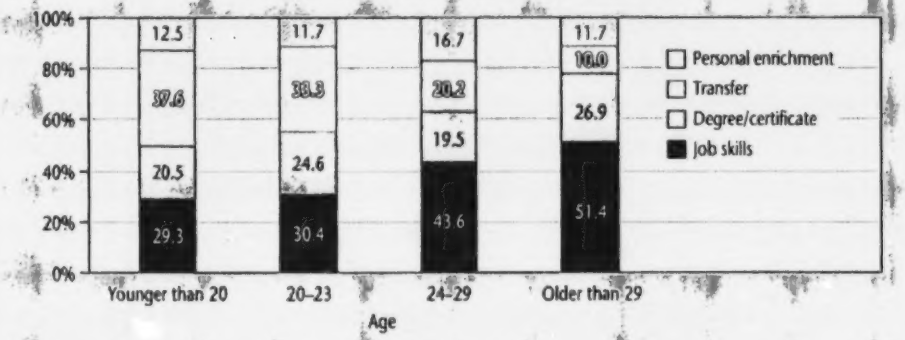
Postsecondary vocational students vary in their reasons for participation.

Given the diversity of those who participate in sub-baccalaureate vocational education—in age, employment status, income, and other circumstances—it is not surprising that vocational courses serve a variety of purposes. Recent surveys asked students for the primary reason they enrolled in postsecondary course work, with a set of fixed possible response categories: job skills, degree or certificate completion, transfer (to a higher-level educational institution), or personal enrichment.[16] The variation in students' goals and expectations has implications for judging the success of both students and institutions (Figure 4.5 and Figure 4.6).

- ***Obtaining a sub-baccalaureate credential or transferring is the most common objective for vocational students.*** Nearly half of all those enrolled in postsecondary vocational programs say they want to earn a degree or certificate (23.6 percent) or are intending to transfer (22.4 percent). Younger students are most likely to be seeking these objectives: most vocational majors younger than 20 years of age report earning a credential (20.5 percent) or transferring to further education (37.6 percent) as their primary reason for participating.

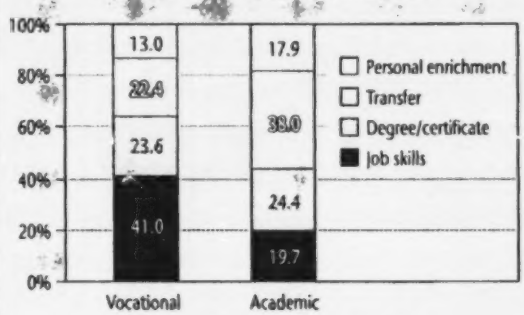
[16]Even though students were forced to select a *primary* reason, these reasons may not be mutually exclusive.

Figure 4.5
Percentage Distribution of Postsecondary Vocational Students, by Age and Reported Primary Goal



SOURCE: Bailey et al. forthcoming. Analysis of National Postsecondary Student Aid Study 1996.
Percentages may not add to 100.0 due to rounding.

Figure 4.6
Percentage Distribution of Sub-baccalaureate Students, by Major and Reported Primary Goal



SOURCE: Bailey et al. forthcoming. Analysis of National Postsecondary Student Aid Study 1996.
Percentages may not add to 100.0 due to rounding.

The goal of obtaining a degree or certificate or of transferring to another institution is even more common among students in sub-baccalaureate academic majors (a total of 62.4 percent). The biggest difference by major is that fewer vocational students (22.4 percent) than academic students (38.0 percent) cite transferring as their primary reason for enrollment. These differences in transferring as an objective are consistent with differences in students' stated educational aspirations. Vocational students are less likely (75.4 percent) than academic students (89.6 percent) to expect to complete bachelor-level or higher degrees. Instead, certificate and associate degrees are a relatively more common aspiration among those who enroll in postsecondary vocational programs.

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- ***Many students enrolled in sub-baccalaureate vocational programs want to increase their job skills.*** Among those choosing a vocational major, a significant share (41.0 percent) do so to enhance their job skills, probably in hopes of better employment opportunities. In contrast, only 19.7 percent of academic students cite job skills as their primary reason for enrolling.

  Older vocational students are most likely to pursue this goal. Just more than half (51.4 percent) of those 30 years and older cite increasing job skills as their primary reason for participating in vocational courses and programs. However, even for some older students, obtaining a credential is still important (36.9 percent cite a sub-baccalaureate credential or higher as their primary objective).

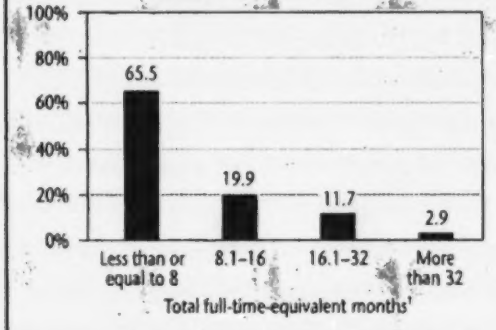
- ***Some vocational students participate for enrichment purposes.*** Fewer vocational and academic students (13.0 percent and 17.9 percent, respectively) cite personal enrichment as their primary reason for enrolling in postsecondary course work.

Many students do not complete enough course work to achieve their likely goals.

Many students, both vocational and academic, leave sub-baccalaureate institutions and programs having completed few courses. In fact, most postsecondary vocational students (65.5 percent) complete a year or less of courses within a five-year time period (Figure 4.7).[17] Given these low levels of participation, a large share will fail to obtain any credential or to earn sufficient credits for transferring to a baccalaureate program.

Figure 4.7

Percentage of Postsecondary Vocational Students, by Number of Months of Course Work Completed within a Five-Year Period



SOURCE: Bailey et al. forthcoming. Analysis of Beginning Postsecondary Students Longitudinal Study 1996.

[1]Eight full-time equivalent (FTE) months are approximately equivalent to one full year of course work.

[17]Additional comprehensive information about postsecondary course taking comes from postsecondary transcripts. Although NCES is currently preparing the postsecondary transcripts of a nationally representative sample of 1992 high school graduates (NELS), the most up-to-date postsecondary transcript data currently available are for students who graduated from high school in 1982 (The High School and Beyond Study). Among the 1982 graduates who attended two-year institutions, more than half completed a semester's worth or less of credits over a 10-year period (Kane and Rouse 1999). Since a large share of sub-baccalaureate students are older, and older students have lower persistence rates, the figure based on the 1982 high school graduates certainly underestimates the proportion of sub-baccalaureate students who complete only a few courses.

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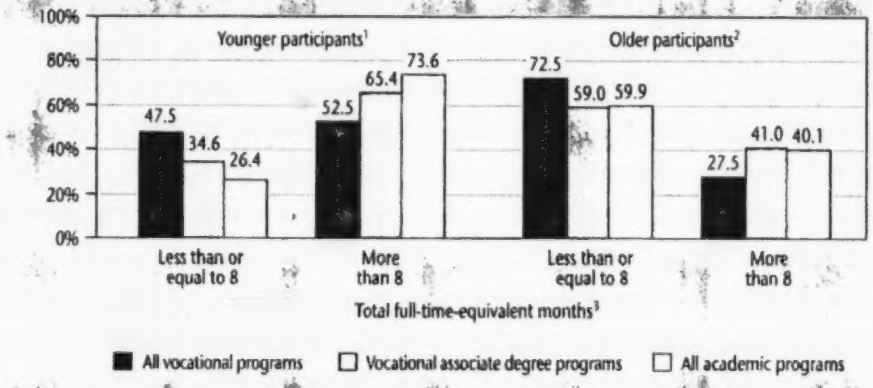
The varied reasons that individuals participate in vocational programs, and the influence these reasons may have on the number of months students attend suggest that the only or best measure of student success may not be whether or not they obtain a credential. Another or perhaps better indicator might be whether students complete what they intended to; this suggests examining postsecondary participation patterns by education goals. The available data do not allow such analyses but do support comparisons by age.[18] Because older students are much more likely to report job skills as their primary reason for enrolling, while younger students are more likely to cite degree completion or transferring as a primary reason (Figure 4.5),[19] examining the extent of participation by age probably provides a picture similar to that of persistence by goal. Age is also a reasonable proxy for labor market experience. Therefore, comparing persistence by age may also provide information about whether or not completion and credential attainment might matter less to participants who have longer work histories (Figure 4.8).

Figure 4.8

Percentage of Sub-baccalaureate Students, by Major and Age and Number of Months of Course Work Completed within a Five-Year Period



SOURCE: Bailey et al. forthcoming. Analysis of Beginning Postsecondary Students Longitudinal Study 1989–1994.

[1]Younger=23 years old and younger.
[2]Older=24 years old and older.
[3]Eight full-time equivalent (FTE) months are approximately equivalent to one full year of course work.

[18]It is not possible to examine participation patterns by goals over time because student goals are only identified in NCES surveys for which there is currently insufficient follow-up data to determine students' completion.

[19]Younger students are defined as those enrolled at the ages of 23 years old and younger. Older students are those older than 23 years of age who are enrolled in postsecondary education.

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- ***Older vocational students have short periods of participation.*** During a five-year period, nearly three-fourths of the older students in vocational majors are enrolled in the equivalent of eight full-time months or fewer of course work.[20] In contrast, just less than half of the younger vocational participants are enrolled for only eight months.

- ***Younger vocational students complete more postsecondary course work than older students but less than their academic peers.*** Within the same five-year time period, just over half of the younger vocational participants (52.5 percent) accumulate more than eight months of course work, while only 27.5 percent of older vocational participants do so. Even so, the persistence of younger vocational students falls well short of that of academic sub-baccalaureate students; 73.6 percent of younger academic students compared to the 52.5 percent of younger vocational students complete more than eight months of course work.

The comparatively short period of postsecondary participation among some vocational students, particularly older students, is in keeping with their stated goals. First, many of the older students cite improving job skills as their primary reason for enrolling (51.4 percent among those 30 and older). These participants likely opt for shorter-term education and training. Second, a significant proportion of vocational students enrolls to earn a certificate, and these programs are typically of short duration (about a year of full-time equivalent course work or sometimes less). Some of those certificate seekers probably complete the necessary course work within an eight-month time frame; others probably do not. To the extent that older students already have labor market experience, obtaining a postsecondary credential may be less crucial for employability.

However, the persistence of the youngest vocational students, those least likely to have significant labor market experience, does raise some concern. Most of them (58.1 percent of those less than 20 years of age) seek degrees, certificates, or transfers to a higher-level educational institution. Degree completion requires many more courses than might typically be the case for job skill training and is not attainable within eight months or less.

It is certainly possible that completing a few courses provides sufficient economic benefits for this group of younger students. However, it is more likely that the 47.5 percent of younger vocational students who leave postsecondary education with fewer than eight

[20] Given the limitations of the most recent data, the actual number of courses taken is not available. However, the number of months of postsecondary participation along with the intensity of participation allow for a calculation of full-time equivalent (FTE) months. Eight FTE months are roughly equivalent to one full year of course work.

months of course work (Figure 4.5) do so without having achieved their objectives and lacking a sufficient signal of their job skills. Even among those younger students enrolled in vocational associate degree programs, a significant proportion (34.6 percent) completes only a year or less of course work—a higher proportion than that of their academic peers (26.4 percent completes only a year or less of course work). These results suggest that the goal of increasing degree and certificate completion, as reflected in current Perkins policy, at least for this younger group of participants, may be appropriate. The NAVE final report will examine whether such students attain economic benefits despite their limited attendance.

Implications

Vocational programs and courses are an important part of postsecondary education and training. Not only do vocational students account for about one-third of all students in postsecondary education, but also they tend to be more disadvantaged than academic students at either the sub-baccalaureate or baccalaureate level.

Postsecondary vocational students are themselves a diverse group. They arrive at Perkins-eligible institutions—community and technical colleges, area vocational centers, etc.—with a wider and more disparate set of goals than do students with academic majors. Younger students tend to enroll seeking a degree or certificate or seeking to transfer to higher-level institutions. Older participants are more likely to enroll to upgrade their skills to obtain better jobs. About one quarter of sub-baccalaureate vocational participants enroll in noncredit course work, and they look different—they are more advantaged and less interested in degrees and certificates—than the vast majority of participants who enroll in for-credit courses and programs. Whether any of these students accomplish what they set out to do is a key concern, given that most leave vocational education after a relatively short period of enrollment. Their characteristics and participation patterns raise several additional issues.

Are federal objectives aligned with actual participation in postsecondary vocational education?

Perkins III has many objectives, as discussed in Chapter 2: to improve academic and technical competencies, to promote degree completion and further education, to encourage placement in employment, and to provide better access for disadvantaged and other special populations. To what extent does participation in vocational education reflect these priorities and support a federal investment in postsecondary vocational education?

For the most part, enrollment patterns are consistent with the federal emphasis on promoting postsecondary attendance and completion, particularly for disadvantaged students. First, Perkins funding mechanisms and accountability provisions support a preference for for-credit programs that lead to a credential over short-term, noncredit, nondegree training. As it turns out, Perkins-eligible institutions serve almost twice as many vocational students in for-credit courses and programs than they do students in noncredit courses. In addition, participants in for-credit programs are more likely to be disadvantaged, making the for-credit emphasis consistent with Perkins' priority on serving disadvantaged students. Second, vocational students' stated goals for participation suggest that high proportions of students at least intend to pursue a degree or certificate (23.6 percent) or to transfer to a baccalaureate program (22.4 percent).

On the other hand, the objectives of some postsecondary vocational participants highlight a potential conflict with Perkins' degree completion emphasis. A significant proportion of vocational students (41.0 percent) enrolls primarily to upgrade their job skills rather than to obtain a credential. Moreover, because most of the job-skill seekers are already working, as are other vocational students, they may not contribute to another Perkins accountability measure—increased job placement. Further assessment of Perkins accountability requirements will be included in the NAVE final report.

Although participation information is a first step in discussing whether or not and how federal policy might support vocational education, it is only a first step. Perhaps of greater importance is to understand the *effect* of participating in postsecondary vocational programs, particularly in light of the different circumstances under which students enroll, their varied objectives, and the offerings in which they might participate. These key issues will also be discussed in the final NAVE report.

To what extent is the population served by postsecondary vocational education similar to intended participants in the WIA system?

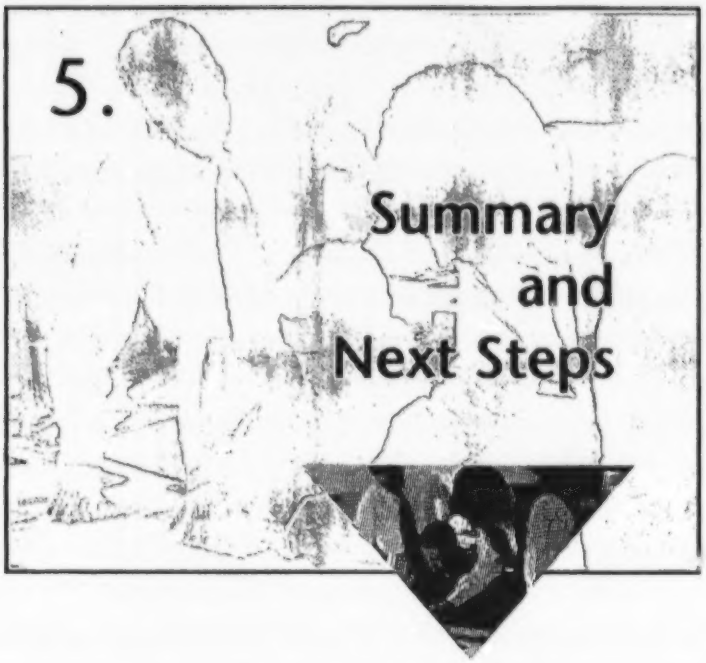
When Congress enacted the Workforce Investment Act and Perkins III, it believed a plethora of job training programs created excessive administrative burdens upon states and discouraged access to services. The call for better coordination between WIA and Perkins, in part, reflected a perspective that providers in the job training and education systems already did or could offer similar services to similar groups of participants. Although too early for the national participation data described above to measure any actual changes in those served, the analyses can offer some indication of the potential overlap in populations.

These data suggest that the proportion of vocational participants with characteristics similar to expected WIA participants is small. Training services are offered only to those WIA participants who are unemployed, are below an income threshhold, and are identified as requiring further training to become employable or employed. Such individuals are most likey to be found among the sub-baccalaureate vocational students who enroll to enhance their job skills (41.0 percent), since an emphasis on improving "job skills" is most in keeping with the short-term training envisioned in WIA.[21] These vocational students are typically older and many are disadvantaged: 62.7 percent have parents whose highest level of education was a high school diploma or less and 18.8 percent are single parents. However, only about a third of the older students emphasizing a job skill objective—about one in ten vocational students taking for-credit courses—earn less than or equal to $20,000 per year, the self-sufficiency income standards set by some local Workforce Investment Boards.[22]

Thus, vocational programs currently appear to serve a relatively small number of individuals similar to those most likely to be targeted for intensive services under WIA. However, it remains to be seen: (1) to what extent states allocate job training resources to services such as those offered at postsecondary institutions and (2) how many of those receiving WIA training vouchers (individual training accounts) actually enroll in Perkins-eligible institutions and programs. These actions will play a significant role in the potential integration of vocational education and workforce development programs. A study examining these issues is being conducted for the NAVE and its results will be discussed in the final report.

[21] Relying solely on the stated goal "job skill" to identify participants in vocational education who most resemble potential WIA participants may underestimate the WIA relevant population. Some WIA participants may have a long-term goal of completing postsecondary degrees or certificates. Certainly, low-income students who state degree completion goals as their primary reason for enrolling in vocational education have characteristics consistent with potential WIA participants as well.

[22] A recent U.S. Department of Labor report (D'Amico et al. 2001) indicates that self-sufficiency standards were set around $20,000 in some of the visited sites.



5. Summary and Next Steps

This interim report is one part of a broader assessment of vocational education in the United States. Though many students in secondary and postsecondary education are engaged in vocational studies, the most important question is how the reexamination of the Carl D. Perkins Vocational and Technical Education Act (Perkins III)—scheduled for 2003—can be used to improve student success.

In preparation for those discussions, this first NAVE report lays the groundwork for the more comprehensive report to follow. The interim report describes historic trends in federal vocational education policy and the key legislative changes that were enacted in 1998. To help policymakers understand what vocational education is today, the report outlined the current signals of federal policy objectives, the broad changes occurring in the field of vocational education, and recent trends in both the number and characteristics of students engaged in vocational education at the secondary and postsecondary levels. The major results from this report are worth summarizing, but much of the information central to an assessment of vocational education is yet to come.

Key Themes of the Interim Report

Although several topics are addressed in this document, four themes stand out.

Federal policy attempts to achieve multiple goals and objectives.

Over time, federal vocational policy has attempted to address changing social, educational, and labor market concerns. These evolving priorities have moved federal support for vocational education toward fulfilling a broad set of objectives. For example, the stated purpose of the 1998 Perkins III is to enhance not only the vocational and technical skills of students who choose to participate in vocational education, but also their academic skills. In addition, other sections of the legislation suggest that vocational education is expected to contribute to high school completion, entry into postsecondary education and training, postsecondary degree completion, and employment.

Currently, federal policy allows states, school districts, and postsecondary institutions to decide which objectives are the highest priority for Perkins spending. In contrast, Title I of the recently enacted No Child Left Behind Act, with funding now 10 times greater than Perkins, is unambiguously focused on one core mission: raising the academic achievement of disadvantaged students.

Vocational programs vary, perhaps to meet different objectives.

Though once regarded as programs to prepare students for jobs after high school, many vocational programs at the secondary level are now much more than that. Over the past decade, new program initiatives have been undertaken to promote other objectives—such as academic improvement and college enrollment. Other efforts have tried to broaden students' knowledge of careers, both vocational education's traditional ones as well as those requiring four-year college degrees. Although students who are economically and educationally disadvantaged still participate at higher rates, the overall group of participants is quite diverse and may be growing more so. There is some evidence that vocational education has begun to serve relatively more academically talented students, possibly as a result of the new programmatic efforts.

At the postsecondary level, sub-baccalaureate vocational education is equally diverse. Associate degree programs differ from certificate programs, and the for-credit courses that make up these programs may or may not differ from the noncredit occupational courses offered by the same institutions. These different ways of offering and organizing courses, in part, reflect the varying goals of those who participate in postsecondary vocational education. They come for different reasons—to get a degree or certificate, to trans-

fer to four-year degree programs, or to enhance their job skills. They also bring different life experiences in terms of age and employment history, and some students are more disadvantaged than others. Although there may be a trend away from degree seeking among sub-baccalaureate students as a whole, the seeming priority in Perkins III on for-credit, degree-oriented course work is consistent with the law's emphasis on serving disadvantaged students, because for-credits courses are more likely than noncredit courses to be taken by these students.

Secondary vocational education remains a large component of the high school curriculum, but the full effects of academic reform are not yet evident.

Although vocational education's overall share of the high school curriculum has declined as students have earned more academic credits, there has been little change in the amount of vocational course work taken by high school students over the past decade. Students still earn more credits in vocational education than they do in math or science. As challenging high-stakes exit exams become more common, however, vocational enrollments are likely to face serious challenges.

Low levels of course completion in postsecondary vocational education is a concern.

Students enroll in postsecondary vocational programs for varied reasons. Unfortunately, many of them, like their academic counterparts, leave sub-baccalaureate institutions and programs having completed few courses. For older students with substantial work experience who enroll mostly to improve their job skills, a course or two may be exactly what is needed or desired. Some may even obtain one of the newly emerging industry- or employer-developed certifications (e.g., Microsoft, Cisco, Automotive Service Excellence), which may be an important way to realize labor market gains without actually earning a degree or institution-based certificate.

Those same one or two courses, though, fall well short of expectations for those working toward a postsecondary education credential. About half of all sub-baccalaureate vocational students indicate they want to earn a degree or certificate, including those who intend to transfer to obtain their bachelors' degrees. These students tend to be younger, and many are recent high school graduates with limited job history. For these students, in particular, college degrees can lead toward labor market success as well as the fulfillment of personal goals. But it is likely that the nearly half of younger vocational students who leave postsecondary education with eight or fewer months of course work do so without having achieved their objectives and without a concrete labor market signal of their skills.

The Final Report

The data in this initial report addressed one of several important questions for policy: Who enrolls in vocational education in high schools and postsecondary institutions and for what purpose? That analysis, however, raised questions about the effectiveness of vocational education for different subgroups of students, the consequences of new funding and accountability provisions for programs and participants, the implementation of vocational education, and its alignment with other major reform efforts. All of these key issues will be examined in the final report.

What is the contribution of vocational education to student outcomes?

Perhaps the most important issue is whether students are better off as a result of participating in vocational education, either in high school or at the postsecondary level. In light of changing objectives for vocational education, the NAVE final report will use both national and state-level data to examine a broad set of concerns:

- What effect does secondary vocational education have on students' academic achievement, chances of attending and succeeding in college, and wages and earnings?
- What is the "value added" at the postsecondary level in terms of labor market success—for both those who complete a degree and those who leave without a credential? How important is the degree?
- How do impacts for secondary and postsecondary participants vary by course taking patterns, by field of study (e.g., cosmetology as well as technical engineering), and by student characteristics (academic achievement, disability status, income)?
- To what extent do the new secondary vocational education strategies (e.g., career academies, Tech-Prep, High Schools that Work) make a difference in key student outcomes? Is there evidence that these new programs are "better" than traditional vocational course sequences?

How effective are the performance measurements systems established by the states?

For most federal education programs, establishing an effective, workable accountability system has proven to be more difficult and time-consuming than initially thought to be the case (Goertz, Duffy, and Le Floch 2001). Congress first enacted Perkins performance

measures in 1990, and in 1998 significantly raised the requirements for state reporting on student performance. Today, state responses to federal accountability requirements are still under development. Based on early implementation experiences, the NAVE final report will examine:

- How much progress has been made under Perkins III by states, schools, and post-secondary institutions in developing appropriate measures, standards, and data-gathering systems?
- To what extent is performance data used to manage and improve programs versus to comply with federal and state laws?
- Is there any evidence that incentive systems incorporated into Perkins and WIA have the potential to affect behavior?
- Is the reporting of performance data for special populations feasible and useful?

To what extent have the new funding provisions changed grant distributions and state or local practice?

In 1998, Congress enacted several changes affecting the allocations of federal Perkins funds, including giving states and local entities greater flexibility by eliminating set-asides for special populations and freeing up more money for use at the local level. Much of the basic grant allocation process remained unchanged, however. The NAVE final report will examine areas of both change and continuity in how federal resources are allocated. The final report will address three main questions:

- What, if anything, has changed in the allocation of federal resources and the purposes for which they are used as a result of recent legislative provisions?
- Do federal resources, and the methods by which they are allocated, spur program innovation and improvement or simply support program maintenance?
- What has been the effect on special populations of eliminating the set-aside funding streams?

What is the quality of vocational education and to what extent are federal improvement strategies reflected in classroom practice and school organization?

For nearly a decade, federal policy has attempted to improve the quality of vocational programs at the secondary level largely by strengthening the connection between vocational education and mainstream education objectives. Perkins III directs NAVE to examine a variety of issues regarding teachers, curriculum, employers, and program implementation that are loosely referred to as "program quality":

- What are the qualifications and classroom practices of vocational teachers, as they relate to achieving both the academic and technical objectives of federal legislation?
- To what extent are Perkins program improvement strategies—integration of academic and vocational education, secondary-postsecondary linkages, and broadening the focus on industries and careers—evident in state and local practice?
- How and how much do employers participate in vocational education programs? How satisfied are they with program graduates?
- What is the academic and technical rigor of vocational curriculum in different settings in the United States? What can we learn about rigor from vocational curricula used in other countries?

How well aligned is vocational education with education reform efforts at the secondary level and with workforce development efforts at the postsecondary level?

Vocational improvements are intended to keep pace with and complement other reform efforts in high school. For some districts and schools, meeting these objectives requires substantial changes, including new vocational policies or requirements, shifts in instructional methods, or modifications to course content. The final report will assess the relationship between vocational education improvement and school reforms underway in many states and local communities, as well as the role of federal policy in promoting or impeding these relationships.

Enacted months apart, Congress intended that Perkins III and WIA would be coordinated in a manner that helped make a fragmented job training system somewhat more orderly and rational. Provisions for development of unified state plans, participation in One-Stop Centers, and the potential for performance rewards were key provisions in WIA with implications for how individuals gained access to vocational education, the types

of programs offered, and the outcomes by which performance was measured. The NAVE final report will examine the early evidence of change in the direction intended by Congress.

Conclusion

Vocational education and its place in American education continue to evolve. The broadening of its goals, the increasing diversity of participants, and the changing education and labor market climate in which it operates, suggests vocational education is a flexible option for schools and students.

With this flexibility comes some challenges, however. At the high school level, participation in vocational education is an elective choice that faces increasing pressure from emphasis on academic improvement and testing. For both secondary and postsecondary vocational education, the wide range of participants and objectives raises a question about how effective a role federal policy plays and whether that policy can or should promote a clearer set of priorities. The final NAVE report will provide more rigorous evidence to help policymakers and practitioners respond to these issues.

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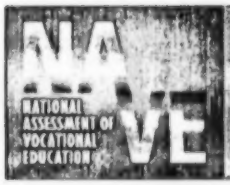

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